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THE AMERICAN GAS LIGHT JOURNAL

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[OFFICIAL NOTICE.]

Eighth Annual Meeting, Ohio Gas Light Association.

OFFICE OF SECRETARY, February 12, 1892.

The Eighth Annual Meeting of the Ohio Gas Light Association will be held at Columbus, O., on March 16 and 17, 1892.

The following papers are promised:

1. "A Basis for Equitable Rates to all Consumers," by M. A. Gemuender, Columbus, O.

2. "The Prevention of Errors in Reading Meters," by A. F. Nash, Windsor, Ont.

3. "The Relation of Holder Capacity to Output," by G. N. Clapp, Middletown, O.

4. "How to Put a Small Gas Works on a Paying Basis," by C. H. Marden, Coshocton, O.

5. "The Testing of Ammoniacal Liquor," by George Osius, Detroit, Mich.

6. "Should Gas Companies do all Gas Fitting," by W. H. Anson, Columbus, O.

7. "The Determination and Regulation of the Proper Proportions of Primary and Secondary Air and of Steam in Regenerative Furnaces," by Fred. Bredel, Milwaukee, Wis.

8. "The Relation between Increase of Output and Decrease in Cost of Manufacture and Distribution," by Henry Padan, Portsmouth, O.

9. "Gas Burners, and the Gas Company's Interest in Them," by J. A. Faux, Pittsburgh, Pa.

10. "The Present and Future Coal Tar Market," by C. H. Welch, Athens, O.

The Question-Box will be opened as usual.

The Chittenden Hotel will be our headquarters, where those in attendance at the meeting will be granted a reduction in rates to $3 per day. The sessions will be held in the Gas Company's employees' hall, at the gas works, one square from the hotel.

A model Stroh & Osius concentrator, of a size adapted to a small works, will be exhibited in operation in the scrubber room at the gas works.

There will be the usual public exhibit of gas stoves, etc.

The Association badges will be ready for distribution, to those ordering them, at the meeting. IRVIN BUTTERWORTH, Sec.

BRIEFLY TOLD.

DEATH OF MR. JOHN P. KENNEDY.—It is with great regret that we make the announcement of the death of Mr. John P. Kennedy, President of the Mutual Gas Light Company, of this city. His death, which terminated an illness of three weeks' duration, occurred Saturday, February 27th. The funeral services were celebrated at the Kennedy residence, on the morning of March 1st. In our next we will print an account of Mr. Kennedy's connection with the gas industry, with which business he was largely and actively identified for many years.

THE ANNUAL MEETING OF THE OHIO ASSOCIATION.—In less than a fortnight the Ohio Gas Light Association will have completed its eighth annual session, and then the road will be clear for the Western meeting in bonnie May. Secretary Butterworth, judging from the agenda that we are publishing in the form of official notices, must have been up with the lark, for he has everything in good shape for the Columbus convention. Ten numbers on the paper list is abundant proof that Ohio, which owns six of the ten writers as her subjects, still has time for thought; while the remaining four are evidence that Ohio also can appeal with success for help from without her borders. The subjects to be treated are brimful of interest, and if there be no notable withdrawals from the promising contributors the meeting should be a most interesting one. The propinquity of the meeting hall with the hotel selected for headquarters is a most satisfactory feature; and it strikes us that the proposition to hold a convention of gas engineers in the precincts of a gas works is a novel one. But Ohioans are notable for some of their novelties of action, and the idea is not only novel but neat. Some years ago General Hickenlooper banqueted the delegates to an Association

meeting in the purifying house of the then almost new station of the Cincinnati Company, and it is not a year ago since the same astute gas man regaled his shareholders with a feast in a gasholder tank. As no bad effects were subsequeutly reported from these unique entertainments, the members of the Ohio Association need not be afraid to speak out their minds in a location somewhat similar to that in which under other circumstances they thoroughly enjoyed the fullness of a feast. An exhibit of gas apparatus has, as usual, been provided for; those who proposed to show goods having cheerfully acceeded to the moderate charge which the Secretary suggested would be necessary to defray the expenses of getting the exhibits together and maintaining the same for the time specified. The prospects for a valuable and entertaining meeting are very bright.

THE PROTESTANTS AT THE CHICAGO MASS MEETING OF INDIGNANTS.—Chicago is nothing if not enthusiastic, and all this seething, bubbling and blinking belief in the idea that everything that is done in Chicago is performed on a big scale leads frequently to a mighty conflict betwixt fact and fancy. When the Chicago Gas Light Company sent out its bills a few weeks ago, there was (at least that is what the newspapers out that way say) a mighty roar of discontent, which finally blew itself up to the proportions of a veritable gale of public opinion—adverse, need we add, to the Gas Company. The bills were absolutely outrageous. To think was to grieve, to grieve means to agitate, to agitate in Chicago means to resolve. And that was the outcome of the gas howl. Taking note of the time-honored custom, to which we have so often alluded in the past, they hired a hall—also a truck, on which several members of a German band were carted about the city, the sweet tones from whose trumpets were the magnets that attracted attention to strips of silesia, attached to the sides of the aforesaid truck, bearing the words, "Assemble at Central Music Hall," on such a date; "citizens, save yourselves from the robber gas barons of Chicago," and so on. The citizens "assembled" in due time, and in some unequalness, and the next day the newspapers blazed out in noble headlines, and in strict Chicagoese English, the triumphs of the gathering. In sober earnest one would think that the Gas Company was doomed, if he could only believe the newspapers. Hundreds of indignant citizens were present and the concert of action was rather more musical and resonant than that of the truckload of musicians. We were told that a league had been formed and that the Company was about to experience the greatest shock of its life. The real facts about the meeting, though, are the following, which were forwarded us by a correspondent who was at the Central Music Hall seance: "* * * I took in the meeting and it was a farce. 250 spectators, including 7 women, 1 colored man, 14 reporters and 36 empty chairs, on the stage, constituted the mass meeting, and all—excepting the chairs—looked as though they scarcely knew what they were there for. The speakers did not work themselves into much of a fury, and they did not use the term 'grasping monopoly' to one-fourth the extent that I supposed they would. Practically all they did was to say, 'Let's call ourselves a league.' The chief fun of it was that Mr. O'Connell, a labor agitator, engineered to get the meeting to indorse a local ordinance restricting pipe fitting. He had no business to attempt it; but that made no odds, and in getting the indorsement by the meeting effected they nearly broke up in a row. Take it all in all, it was a great farce."

The Market for Gas Securities.

Consolidated was rather dull, but the range was narrow. The opening price to-day (Friday) was 112½, and the feature was an absence of both buyers and sellers. Although the quotations are merely nominal, 110 would bring out many of the former. Rumor, and more than rumor, has it that Mr. McMillin will leave the Standard menagerie, and that Mr. Glasgow will follow his leader. Their appearance on the classic ground of Pleasant avenue was pyrotechnical, their exit is amidst the echoes of the boom—ah! Another rumor is that a certain Company will issue $4,000,000 of bonds, the proceeds of which are to be applied to extending the business of the Company. In the meantime the Standard Company will pay a dividend of 1½ per cent. on the preferred stock, checks for which may be looked for after April 1st. The books close on the 28th inst., to be reopened on April 2d. Over in Brooklyn the many cooks who are spoiling the consolidation broth have got in some very fine work in the last few days, with the result that the proposed coming together is about farther off than ever. Baltimore Consolidated is at 49½, and Chicago is not so strong as before the reported absorption of the Economic Company. The Troy (N. Y.) Company has issued another half million of bonds. The capital and debt now stands at the following: Stock, $1,000,000; bonds, $1,000,000—prettty good for Troy and Tony.

[OFFICIAL REPORT—REVISED BY THE SECRETARY—CONTINUED FROM PAGE 298.]

TWENTY-SECOND ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

HELD AT YOUNG'S HOTEL, BOSTON, MASS., FEB. 17 AND 18, 1892.

FIRST DAY—FEB. 17—AFTERNOON SESSION.

ELECTION OF OFFICERS.

The President having asked if the Committee on Nominations was ready to report, Mr. Sherman (of the Committee) presented the names of the following gentlemen as those selected by the Committee to act as office bearers for the ensuing year:

President.—William A. Wood.
Vice-Presidents.—Charles H. Nettleton and Z. M. Jenks.
Secretary and Treasurer.—Charles F. Prichard.
Directors.—S. J. Fowler, F. W. Norton, E. C. Learned, John A. Coffin, and A. K. Quinn.

On motion of Mr. Harbison the report of the Committee was accepted, and Mr. S. G. Stiness was appointed, in behalf of the Association, to cast the ballot for the election of the nominees.

Mr. Stiness—Gentlemen, I am about to cast the ballot of this Association for the election of the gentlemen whose names you have heard read. If there is no objection I will cast the ballot.

The President—The vote has been cast by Mr. Stiness for the list of nominees as read to you, and I declare those gentlemen elected officers of the Association for the ensuing year.

Mr. Harbison and Mr. Sherman were appointed a committe to escort the President-elect to the Chair.

President Allyn—Gentlemen, it gives me great pleasure to introduce to you our President-elect, Mr. Wm. A. Wood.

President-elect Wood—Mr. President and Gentlemen of the Association: I realize very fully that in succeeding Mr. Allyn I am stepping into a very large pair of shoes; but if I should rattle around in them considerably I know that your good nature will lead you to make all due allowance for differences for which I am not perhaps altogether responsible. I assure you I appreciate the honor, and shall do my level best to govern this turbulent and unruly body fairly and impartially; and I shall request the Secretary to begin to extort papers at once for our next annual meeting. I thank you heartily, and again assure you that I appreciate the honor.

MEMORIAL TO THE LATE JOHN ANDREW.

Mr. Leach, on behalf of the Committee to whom was referred the preparation of the memorial on John Andrew, presented the following:

Our late associate, John Andrew, was called from this his earthly home on the evening of Wednesday, Feb. 10, 1892. His death leaves a void that it is impossible to fill. There could be but one John Andrew. Open-hearted, generous, a warm personal friend to all with whom he came in contact—qualifications few of us possess. Your Committee offer the above, and the following resolutions, for your consideration:

Resolved, That by the death of John Andrew the New England Association of Gas Engineers has lost a member whose place cannot easily be filled. Thoroughly posted as he was upon all matters connected with the gas industry, his advice was eagerly sought for and cheerfully given by him.

Resolved, That we extend to the wife and family our deepest sympathy for them in their affliction, and trust that He who doeth all things wisely and well may watch over, guide and protect them.

Resolved, That the Secretary forward to Mrs. Andrew an engrossed copy of this memorial, suitably framed, and that a page be set apart upon our records upon which this preamble and resolutions may be transcribed.

On motion of Mr. Stiness the report was received, and the resolution adopted by a rising vote.

The President—We will now give our attention to the reading of a paper by Dr. Robert Amory, of Brookline, entitled

A DESCRIPTION OF THE NEW GAS AND ELECTRIC PLANT OF THE BROOKLINE GAS LIGHT COMPANY.

About a year ago the Directors were authorized to build, upon a lot of marsh land situated at the intersection of Cambridge street and Charles river, a new gas plant and electric light station. The difficulty to be contended with was a mud soil resting upon a quicksand upon the banks of the river. The average depth of the mud was about 30 feet below the level of the marsh. In order to secure this land upon its shift-

ing bottom of quicksand, it was necessary to build a stone wall resting upon piles on the Harbor Commissioners' line upon Charles river. This work was begun in December, 1890, and the stone wall was supported upon a plank cribbing fastened by cross beams to the top of the piles. A wharf outside of this stone sea wall, with a frontage of 428 feet, was built of oak piles, and upon this wharf was erected staging and platform for a Hunt automatic railway and hoisting apparatus with a movable crane for hoisting coal from vessels alongside. In March, 1891, we laid out a plan, and commenced immediately to drive piles for the support of all the buildings. Upon the tops of the piles were fastened cross beams and stringers to hold the plank cribbing upon which the stone foundations were to be placed. The grade of this cribbing was established so that at every tide all the woodwork would be immersed in water for an hour and a half. The foundation stone wall was laid with a trench or hollow, to allow the free ingress and egress of the tide water all around the foundation, which trench was connected by waterways to the river.

The general plan of the gas manufacturing buildings was established of which the following is a general feature.

The working floors are upon a level of about 17 feet above the mean high water mark. The intermediate space, between the cellar floor and this working floor, in height about 11 feet, is used as a basement or air space, which is utilized to carry all the gas pipes required in the manufacture and purification of gas. To reduce the number of laborers to the smallest economical limit, the working floors in each building are provided with ready and quick access between the several departments, by means of bridges and stairways; consequently, you will observe that one can readily pass from the condenser to the scrubber, exhauster and gate rooms, and into the purifying, meter and governor rooms, also, in and out of the lime and oxide of iron storage houses. Further to economize labor, hydraulic elevators are used to raise the coal and lime on to the working floors, and, by means of hydraulic power, the covers of the purifying pans are raised or lowered mechanically.

To reduce the labor of taking coal from the holds of vessels alongside our wharf, hoisting apparatus is made use of wherewith the buckets are hoisted to a hopper in a tower and thence dumped into an automatic car, which discharges the coal inside the coal house after being weighed on platform scales. The coal house sides are constructed at the proper angle of inclination from the vertical to allow the coal to fall into its natural slope of trimming. To discharge coal, in addition to the shovelers in the hold of the vessel there is required to be one man at the hoisting engine and one man to weigh and dump from the hopper.

The coal falls by gravity into the small scale house opposite the door of the retort house, is there weighed in a car which is wheeled to the elevator outside of the retort, thence raised by hydraulic elevator and moved on a railway attached to the iron floor on to a level with the mouths of the retorts. After being loaded by hand-scoops into the retorts, the mouths of which are tightly closed with the Brenner lids, but not luted, the charge will be burned off each 3 or 4 hours. At the end of this charging time, the coke is drawn out of the retorts and allowed to fall, while hot, into the half-depth Flemming furnace, through a furnace door above the level of the iron floor, until the furnace is sufficiently fed. The balance of the coke (say about 70 per cent.) is dropped into the car or barrow beneath the floor and thence removed by a trolley system of buckets to the boiler house, to be fed under the boilers, after being first quenched with water.

There is an arrangement by means of a tar gate at the outlet upon the hydraulic main by which we can set a water seal bearing from 1 to 2 or 3 inches, as we find it expedient. The dip pipes open at 7 inches from the bottom of hydraulic main. After passing from the retort house through the exhauster the gas passes over to 2 condensers, each of which has a condensing capacity of 300,000 cubic feet. Outlet connections are left for the purpose of adding our exhausters now in use at Brookline, which will give an exhauster capacity of 650,000 cubic feet per day. The gas passes through a Walker tar extractor, which is also used to purify the gas from carbonic acid, then into a Standard scrubber, and from thence to the purifying house in which, by a system of valves, the gas can be made to pass into any one of 4 dry purifier boxes without using a center seal. In this way the 4 purifier boxes can be used in any rotation desired. We also propose to transfer our old purifier boxes in use at Brookline to the same purifier room. Then we shall have 8 purifier boxes 18 feet by 20 feet in dimensions, with a water seal of 24 inches depth.

At the end of the purifier house is attached a wooden shed, upon the level of the same floor, inside of which the oxide of iron sponge can be freely subjected to a circulation of fresh air and thus revivified. The spent lime can also be discharged in this same shed into a cart placed underneath.

Attached to the land side of the wharf is a lime storage house from which side the lime can be transported in a barrow to an hydraulic elevator, which is raised to a level with the purifier floor, thence, by a bridge, wheeled into the purifier house.

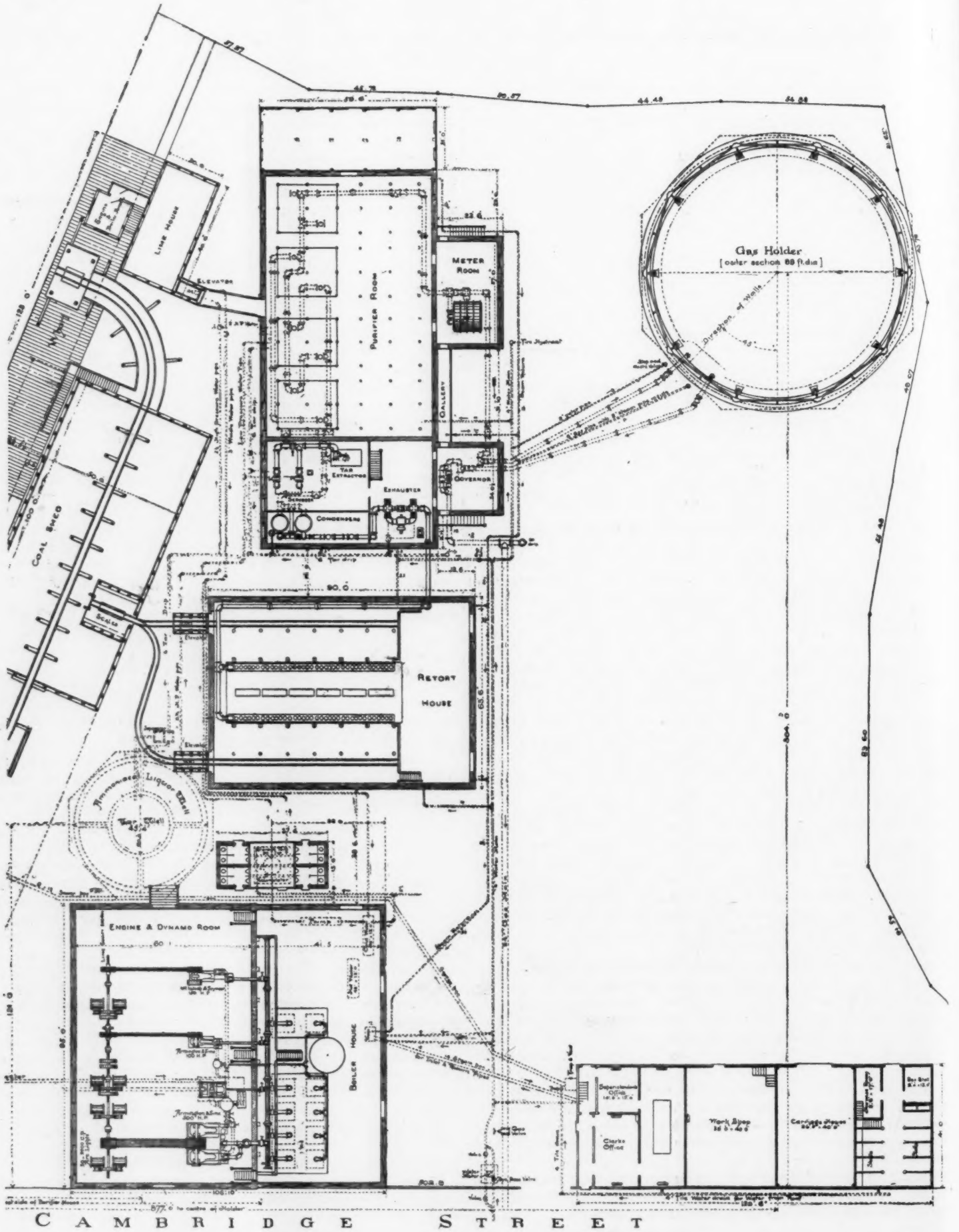
The gas passes from the purifier house into a station meter of 750,000 cubic feet daily capacity, and from thence to the valve house where, by a system of pipes and valves, it can be sent directly on to the street, or, by either of two pipes, to our gas holder in the yard. These two pipes can be used either as inlet or outlet pipes, so, in case of the obstruction of either of them, the one that is obstructed can be shut off and the trouble removed, and the other pipe used as an inlet and outlet pipe. Thus, it will be seen that we have new works with a daily capacity of manufacturing, with our 72 retorts at an estimate of 9,000 cubic feet per mouthpiece, about 650,000 cubic feet, and if we wish to increase we can do so by the addition of 4 more benches of the same kind in the space now left unoccupied at the west end of the retort house; or we can put in at this point a water gas generating plant, whereby we can still further increase our daily capacity.

Our present average daily manufacture in Brookline is about 200,000 cubic feet. At the same ratio of increase as has been shown in the last two decades, we are provided in our new works for the rate of increase for the next 20 years. During this period, we shall probably require two more condensers, for which bases have been left, one more scrubber, which we now have at Brookline, and additional exhausters, and a second station meter; and we have left space in the yard for two more gasholders of the same diameter or larger than that which is now erected. To connect with these two holders, there are four openings in the valve house, and blank end connections are left upon the gas pipe for the disposition of duplicate valves and openings.

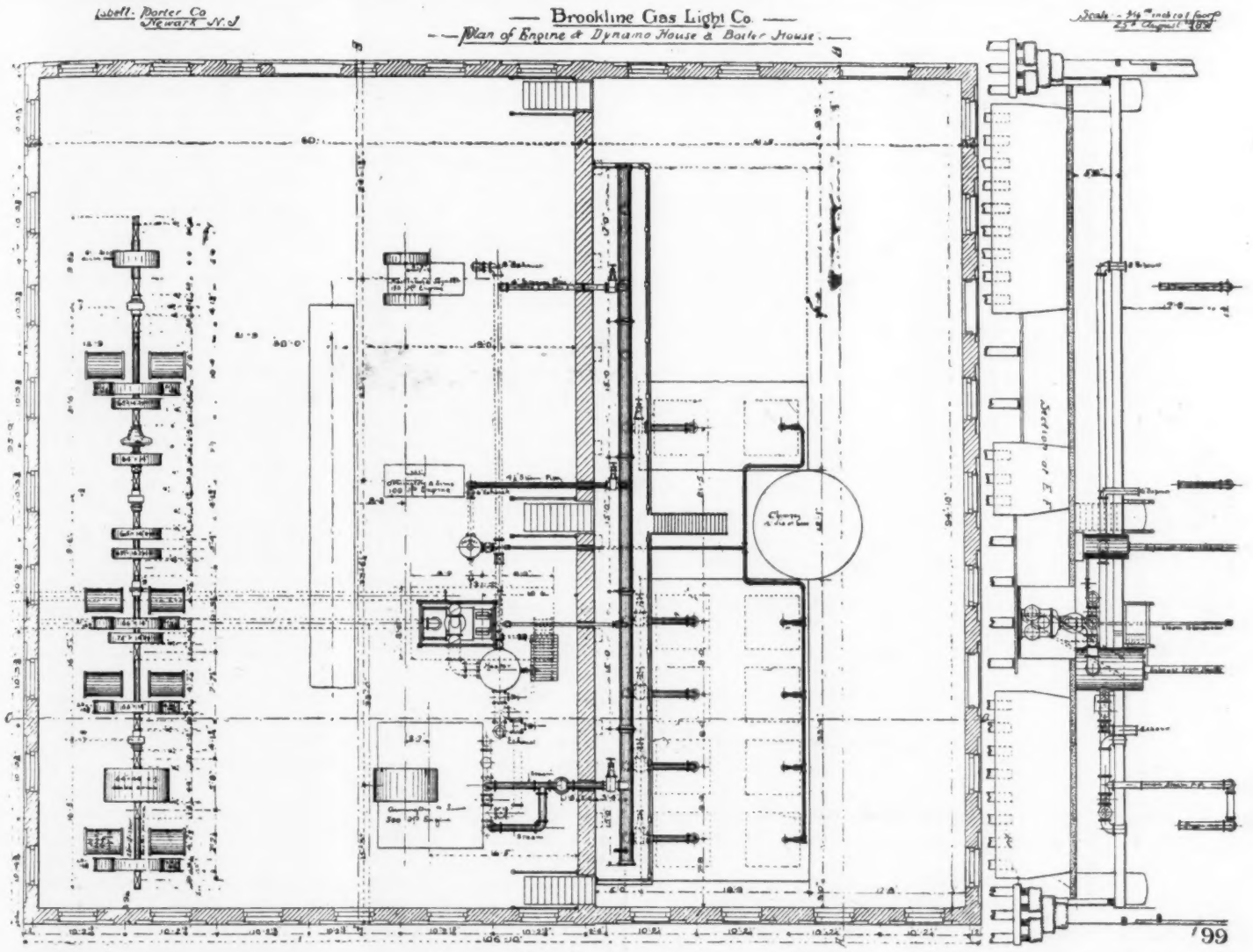
The plan of our gasholder tank is somewhat novel in our New England experience, though more familiarly known in the western part of New York. This gasholder tank is entirely above ground, and was constructed on the following method. 858 piles were driven to hard bottom and cut off below mean low water mark. These were cross-timbered and double-planked, and a concrete surface of the depth of 10 inches was laid upon this planking. An outward ring of the thickness of 6 feet was then laid upon this concrete bed and the center filled with fine gravel and sand. A wrought iron tank bottom made of sheets riveted together was placed upon this ring and gravel bed, and a circular side of boiler iron also made of riveted boiler sheets and built up. After the completion of the two interior lifts, fine Portland cement was introduced by pressure under the bottom of the outside tank until the whole surface, between the gravel bed and the bottom of tank, was filled in with the hardened Portland cement, thus giving a uniform bed of concrete upon which to rest the water tank. The diameter of this tank is 88 feet, and its height, 22 feet 3 inches, and the first section which holds water is 3 feet 9 inches from center of rivet to center of rivet.

The tar and ammonia well is constructed at the northeast corner of the retort house, all the drips for tar and ammonia water being conducted by pipes from the north side to the purifier, condenser and retort houses. A steam pipe is to be laid in the same wooden trench with the tar drip pipes for use in winter. The Isbell-Porter Company found considerable difficulty in obtaining a tight tank on account of the pressure of the sea water, as the bottom of the tank is subjected to a tidal pressure of about 7 feet of water.

In the first instance, 165 piles were driven, which were cut off about 4 feet above mean low water line. The same method of timbering to hold the piles as in the other buildings was employed in this case. Then 3-inch by 10-inch spruce planking was laid on the top of the timber, and on top of that a concrete bed, 9 inches thick, and again three bricks high laid in Portland cement, with a covering of Portland cement. A circular brick tank, 45 feet 4 inches in diameter, was then built to a height of 7 feet. Inside of this enclosure an outer tank surrounds an inner brick tank of 20 feet in diameter, interior measure. Four bridge walls were then constructed to bind the inner ring of brick to the outer ring of brick. Two of these walls, opposite to each other, have a circular opening at the bottom, the other two walls being solid. By this means we could hold in one of the outer tanks the weaker ammonia liquor and in the other the stronger ammonia liquor. The inner wall measures 16 inches, the outer wall being at bottom 24 inches, and above the first 6 feet, 20 inches, or an average of 22 inches. In performing this work the tide pressure broke through in several places the bottom bed of concrete, and in consequence the upper layer of Portland cement, 3 inches in thickness, had to be removed, and in its stead were placed the above mentioned three layers of brick laid in Portland cement. The whole surface of brickwork, both on the bot-



ALLSTON STATION OF THE BROOKLINE (MASS.) GAS LIGHT COMPANY.



tom and sides, was covered with Portland cement, and as soon as completed water was pumped into the tank to equalize the pressure on the outside from the inflow of the tide. This gave us a tight tank for the storage of 13,000 gallons (1,884 cu. ft.) of tar and of 34,000 gallons (4,800 cu. ft.) of ammonia liquor.

An especial feature of our gas plant is an hydraulic pressure system, formed by a central tank cylinder 30 inches in height by 7 in diameter, made of heavy boiler sheets riveted and welded to stand a pressure of 200 pounds to the square inch. This tank is fed by two pumps, which are set in action by an automatic valve opener operated by diminution of pressure exhibited in the accumulator tank mentioned above.

Electrical Department.—From the experience in our electric light station in Brookline, we carefully considered a plan of construction in our new station which should provide commodious and convenient access in all its parts, and especially with a view to economical administration. We consulted expert engineers, and finally decided to employ, as our adviser, Mr. Fry, Chief Engineer of the U. S. Treasury Building in Boston. The result of a studious and careful consideration of the problem, with both Mr. Isbell and Mr. Fry, is the present building, devoted to the creation, evolution and distribution of electrical force and its conversion into light.

The building, which is entirely of one story in height, is arranged with a boiler room for eight so-called 125-horse power boilers, but which are fitted with Smith's patent settings and feed water circulation so as to produce about one-sixth more horse power than is commonly obtained from boilers of that size.

The belt from the engine pulley operates on a shaft built upon a brick foundation 7 feet in height on a concrete bed 7 feet deep; the bottom layer of the concrete resting upon the cribbing of a plank and timber foundation, as mentioned in detail in the description of the foundation of the gas buildings, upon the top of the piles. This masonry bedding is not connected with the walls of the building.

This main countershaft is provided with positive clutches, the unlocking of which allows the separation from the motive power of any one or two of the three engines, whose unit power is 100-horse power, 150-horse power, 250-horse power, or 500-horse power; total 750-horse power.

Briefly, the new electric and power plant when complete consists of a steam generating capacity of 1,200-horse power, using eight horizontal tubular boilers. In the future, if higher pressure or more power is desired, this capacity can be increased by using some form of water tube generator to a limit of 1,800 horse power at 140 lbs. pressure. At present, three new horizontal tubular boilers are in service. The power portion, when complete, will consist of two 500-horse power engines, one 100-horse power engine, and one 150-horse power engine. Of these, the two latter are now in use at the old station. The one 500-horse power engine which has been installed is a twin, compound engine, constructed by the Armington & Sims Engineering Company, of Providence. The cylinders are 21 inches × 21 inches with a stroke of 18 inches, and the speed will be from 200 to 235 revolutions per minute. The engine is piped in a manner devised by Chief Engineer Fry of the U. S. Treasury service, so that either cylinder can be used, if necessary, independently of the other, either at a high pressure or as a simple condensing engine, the two ordinarily operating as a compound condensing engine. By this arrangement scarcely any accident can wholly deprive us of at least one-half of our main source of power. The use of this engine and the application of a condenser to the larger of the two engines to be brought from the old station, will effect a large proportionate saving in fuel over our present consumption, probably, at least, 10 per cent. The shafting erected provides for a capacity of eight 50-light arc dynamos and three 1,000 light incandescent dynamos, and may be readily extended so as to admit of an increase of 100 more arc lights and 2,000 more incandescents, at a relatively small expense. The shaft is so arranged that any one of the engines can drive the whole line, an important safeguard against total breakdown. The use of the Evans system for driving the arc dynamos obviates the use of much belting and so reduces the floor space required that, combined with the type of engines and arrangement of the shafting, we have all our motive steam and electric apparatus, aggregating 1,250 horse power, in one room, 60 feet by 105 feet, without undue crowding; a greater economy of room than is

known in any other electric plant in New England or elsewhere. The steam piping, including that which supplies the heating system and the gas works, is designed for a working pressure of 125 lbs., and is so arranged that any boiler may be cut out at any time without interfering with the others.

In short, the entire plant has been put in accord with modern practice, and, compared with others, at a moderate expense, keeping always in view the necessity for a possible growth, and prepared for that growth by methods of improved design and construction.

The incandescent dynamos, at present to be run on the alternating system, receive their motion from the countershaft (described on a previous page) by belting back to their position on the middle brick pier situated between the engines and the shafting beds. By means of a newly devised switchboard, we can throw any one or more of these dynamos upon one circuit without the danger of running them in multiple or parallel with each other.

Finally, there is no combustible material in any of this construction; even the switchboard and roof being formed of iron and slate.

One obstacle to this form of construction at first seemed difficult to avoid, viz., the condensation of water upon the inside of the iron trusses and purlins of the roof. We borrowed here a simple device in use on our iron steel cruisers. We painted the inside of the iron and slate roof with ground cork and lead paint, which provides an air space around the metal, and thus prevents the warm air from being condensed on the surfaces of the metal and slate. The floor of the dynamo house is constructed of wood, which is entirely supported from the piling foundation, independent of the walls, and is the only combustible portion of the building. We thus save annually in insurance premiums $1,000, at the least estimate. We take our insurance policies only on coal house, office and stable buildings, and a very small amount on the purifier, condenser and meter houses, saving the premium on a value of about $200,000.

Number of Piles Used—Retort house, 639; tar well, 165; lime house, 42; iron shed, 12; gasholder, 858; coal house No. 1, 443; coal house No. 2, 443; boiler and dynamo house, 1,158; purifier house, 509; condenser house, 105; governor house, 62: office building, 96. Total, 4,632. Sea wall, 1,023; gas mains, 60; sheds, etc., 62. Total, 5,775.

Discussion.

The President—We have heard a very interesting paper from Dr. Amory, who I know will be happy to answer any questions that any of you may wish to ask.

Dr. Amory—I will state that Mr. Isbell, who has been our consulting engineer and mechanical adviser all the way through, is present, and that any questions that you may like to ask him he will be happy to answer, either to-day or to-morrow when you visit our works.

The President—Of course the principal discussion of this paper will take place at the works to morrow; but in the meantime we shall be glad to hear any criticism that any member may offer.

Mr. Wood—I would like to ask a question about that interior covering which was put on. I do not quite understand that.

Dr. Amory—I believe almost every one who has had anything to do with iron roofs, knows that the difference in temperature between the inner and outer air causes condensation of moisture. We put a coating of green paint and ground cork on the surface. We first painted it and then threw on the ground cork, and put on four coatings in this way. This gives a roughened surface of paint in which the ground cork is packed as closely as is the sand on sand paper.

Mr. Prichard—How thick are those coatings?

Dr. Amory—The ground cork being in granules of a thirty-second of an inch, the layers of that would probably make about three-eighths of an inch thickness clear through. This was applied by an ordinary painter and not by an expert. After it was done we went over the work with our hands to ascertain where there was any cold surface of iron, and wherever we found the cold surface the painter simply took a board with some ground cork on it, and with a brush of green paint put it over the surface, pressing it onto it.

Mr. Wood—I would like to ask why half-depth furnaces were adopted, when they had a full depth of arch, under a two story house?

Dr. Amory—It requires very skilled labor to manage a full-depth regenerative furnace, and as ours is a small works, and as we have not a very large force of men, we thought it wiser to select a half-depth furnace, which is controllable by the appearance of the flame, or so that the secondary air ports can be opened or shut by watching the combustion at the top of the chimneys. We built the lower base of sufficient depth to put in full depth regenerative furnaces, if we wanted them. We filled it up with stone and grouting to a depth so that we only need use the half depth, but at any time we can use the full depth furnace, if desirable; but it is not desirable in works of our size.

Mr. Harbison—I shall not have the pleasure to-morrow of visiting these works, because the cars will not return in time for me to take the 4 o'clock train, as I shall be obliged to do; but I can assure Dr. Amory that he will have the extreme pleasure of a visit from me at no distant day, and that the visit will be of more than an hour and a half duration. Now, as I shall not be able to go to Brookline to-morrow and discuss the practical merits of this paper on the ground, I want to express to Dr. Amory my personal thanks for the very clear and intelligent manner in which he has laid this whole subject before us. I want to commend him for the wise foresight and care that he has given to the business in which he is engaged. He has shown us in detail the provisions that he has made in his gas station for securing, what he feels sure of, a large increase in the immediate future by providing outlets for additional apparatus as he may require it. I apprehend that he will realize his expectations in 10 years instead of 20 years, as he has modestly stated. He commenced his works right end foremost. He began by putting in a first-class gas plant, and then devoted the remaining portion of his time to an electric plant. That is as it should be. I congratulate him on having a modern gas plant erected according to his own advanced ideas; and I have no doubt he will fully realize his expectations with regard to what he may accomplish there. I shall be much interested in visiting his works at an early day and learning what there is to be seen there. I have no doubt that there is a great deal there which some of us who have old works which have been remodeled a dozen times, do not possess, and I have no doubt that his consumers at an early day will reap the benefit of what he has done and will yet do. I want to say that much by way of commendation. I am not capable of criticising what he has done in the electrical station, for I have had no experience in that line, and am greatly interested in the expedients to which he resorted in an adverse situation to accomplish the end he had in view. He has presented a well written, very intelligent and comprehensive paper, and one that will bear careful perusal and study after the meeting adjourns.

Mr. Neal—I visited the Brookline works some time since, and I would like to ask Dr. Amory whether he is making gas and generating electricity now.

Dr. Amory—We have merely fired up the furnaces at slow heats to dry the masonry. We are waiting until we get the ironwork completely connected before we drive ahead. I think all will be in readiness a few days after the 1st of March. We expect to test the engine within a few days—probably on Friday: and on Monday we shall occupy the electrical station, as we are obliged to move our apparatus from Brookline on account of having insufficient boiler and engine power. By the time we get that moved over we shall be making gas.

On motion of Mr. Lamson a vote of thanks was given to Dr. Amory for his interesting and valuable paper.

A PROPOSITION FOR UNIFORMITY IN CASTINGS.

Mr. Slater read the following communication from the Society of Gas Lighting:

To the New England Association of Gas Engineers: Gentlemen—The Society of Gas Lighting, some time ago, appointed a committee to devise means by which uniformity in flanges and bells of pipes, as well as in special castings used about gas works and in the street department, might be attained.

The fact of a lack of such uniformity has long since become manifest. It has happened to most of our members that castings made of different foundries could not be joined. Each manufacturer adheres to his own way of laying out flanges, bells and spigots. Very few gas companies deal with one manufacturer exclusively; and, in consequence, trouble, delay and annoyance would be experienced when connections between pieces of different origin would have to be made.

Then, again, in the case of special castings, we find that there exists no general rule governing their shape, size and weight. Many of the patterns have been gotten up at various times to meet the exigencies of a particular case. Again, most of the patterns are used for water works purposes, as well as for those of a gas works, although in our case we have no such strains to contend with as in the former. The use of these patterns by the gas engineer consequently burdens him with unnecessary bulk and weight.

As a result of these considerations, and after examining the patterns in use at various foundries, our committee have gotten up the schedule set forth on accompanying blue prints. They have the object of producing specials of uniform size and weight, with the connecting ends,

be they flanges or bells, strictly alike. The designs are by no means novel, but, we think, will meet every practical want.

The Society has finally accepted the plan proposed by its committee.

The advantages, when this system is once generally adopted, of being able to get a casting of fixed dimensions in every respect from any foundry are too obvious to be further dwelt upon.

But, to carry the scheme through successfully, we require the assistance of other Associations of gas men. And we, therefore, earnestly request you to take such action as you see fit, and which may lead to your active co-operation in our undertaking. Fraternally yours,

ALEX. H. STRECKER, Newark,
E. VANDERPOOL, Newark,
D. D. FLEMMING, Jersey City,
A. B. SLATER, Providence.
} Committee on Special Castings of Soc. of Gas Lighting.

By ALEX. H. STRECKER.

The President—You have heard the communication which has been read by Mr. Slater. What action is it the pleasure of the Association to take with reference to it?

Mr. Harbison—The subject of the paper is an exceedingly important one, and should commend itself to every gas man. A few years ago committees were appointed to confer with meter manufacturers with the object of securing uniform couplings to meters. Satisfactory results were secured, the meter manufacturers having co-operated, and that part of the business is now very nicely fixed. It is exceedingly important, as we all know, that pipes and castings should be made to fit, so that when we get pipes at one foundry and castings at another, we shall have no difficulty in putting them together. In order to make the undertakings a success it will need, as has been suggested, the co-operation of the various Associations; and we ought to be ready to lend our assistance. To that end I move you that this communication be received, and that a committee of three be appointed by the Chair, on behalf of this Association, to co-operate with other committees that may be appointed to accomplish this end.

(The motion was agreed to, and the President stated he would announce the committee later.)

The President—We will now listen to the paper, by Mr. H. H. Kelly, of Waltham, Mass., entitled

WRINKLES.

Gentlemen of the New England Association of Gas Engineers: It is not that I expect to derive pleasure, but from a sense of duty which I think that each member owes to this Association, that I, at this time, write this paper for you.

The title for this paper was suggested to me by our worthy Secretary, and I hope that some of the few "Wrinkles" contained herein may be of service to you, all of which we have found by experience to be of benefit; but if there are better ways of accomplishing the same ends we would be very glad to know of them.

They are not *all* ideas of ours. A few are, and the others are those which other *gas men* have tried and we have adopted, but I do not think that they have have ever been put before this Association in any paper.

Wrinkle No. I.—We use as an enricher, *oil* put into 3-inch wrought iron pipes, 4 feet long, 2 quarts at a time, on fresh broken coke. We put one *each* of these pipes in two retorts of a bench of 6's, *one hour before drawing* the charge, for the reason that the short length of time that the pipe is in the retort does not allow it to get as hot as it would if it had been put in at the time the bench was charged, and, therefore, it does not burn up and scale badly, and lasts much longer. The oil, of course, is thoroughly carbonized in that time.

Wrinkle No. II.—We use as oil for our exhausters the best lard oil. Pitch does not form where this oil is used, but will with any kind of mineral oil. It is a saving in every respect to use it, the machine can be kept cleaner, belts are not strained, and, therefore, the engines will do their work easily. A very little oil will answer.

Wrinkle No. III.—Our purifying pans are 10 feet by 16 feet. On two opposite corners of the covers there are pet cocks for testing for sulphur. Usually, when one would show a very faint trace and the other clear, the opinion would be that the gas that was passing to the next pan would be clear also; but such is not the fact. We tapped a half-inch hole in each outlet pipe in the cellar, put a cock there and test there, and find that if one side showed faint and the other clear, in the test above, that the cellar test would also show faint, showing us, conclusively, that it was time to *change*.

Wrinkle No. IV.—All gas men will, of course, admit that it is of great importance to have the lime or iron trays thoroughly cleaned of foul material before putting in fresh. To clean our trays we use an ordinary steel brush, 2½ inches by 8 inches, such as are used in foundries to clean castings. We stand the tray on a box about one inch from the floor, leaning it back against the wall, and take hold of the *ends* of the brush and *draw* it down once or twice, then turn tray end for end and repeat the operation. It is very quickly and thoroughly cleaned; quicker, and, therefore, cheaper, than can be done by any scraper. It is not necessary to thump or strike the trays to dislodge lumps, and slats and bolts are not broken.

Wrinkle No. V.—I read a short time ago of a method for thawing frozen earth. We have had within ten days two chances to try it, and it proved to be a success. Saturday, February 13th, about 2 P. M., we heard that gas was escaping in the cellar of a house. As we had a short time ago repaired a break of a 6-inch tee—caused by sewer construction—near the house, we of course looked for a leak at that point.

We put, on a place over tee about 3 inch by 4-inch, two bushels stone lime, gave it a good wetting, and, when it commenced to slack, covered it with straw, and over that a canvass. About 5:30 P. M. we removed that and found the earth was thawed about three inches deep. We dug that out, and put in two bushels more, wet it, covered it, and let it stay over night. Sunday morning we removed the lime and found the earth was thawed to nearly the depth of frost, 26 inches. What little was left in the ground was easily broken by the pick. Nothing but a little lime lost and a great saving in labor.

In the other case we used two bushels lime. The frost was about 18 inches deep. Having found the break we put on a clamp sleeve, made a new tap for service, and it was finished in eight hours with the labor of two men.

Wrinkle No. VI.—We solder our nipples and meter unions to lead pipe in this way. We cut our lead pipe in lengths from 3 to 5 inches, tapering the ends very slightly inside so that nipples will enter about one-half inch. Flare or cup the end a little, thoroughly clean lead and brass, force the nipples in hard and tight, stand them on iron posts about 4 inches high, set 4 inches apart, made from ½-inch iron pipe, driven in a board. Cut some solder in small pieces, acid the parts well, place the solder on cupped part, take a blowpipe and heat *brass* part first, running the solder even and smooth. We have a connection that is very strong, and in soldering all sizes, from 2 lights to 100 lights, have not yet found a leaky one. It seems to be a great deal of work, but it *can* be done quicker this way than with a soldering iron.

The city of Waltham has, the past year, put in about 30 miles of sewers. Of course our gas pipes were in their ditches, at street corners and also at many other points. We took as good care as possible of our pipes, but you who have had experience with contract filled ditches know just how bad they settle, and break everything in them. We have had, since April last, 38 breaks of various kinds. The largest part we repaired by using clamp sleeves, and in so doing two things are done that perhaps may not be different from the ways of others. As soon as we find the break we clear a place about the pipe large enough to get the hand around, and put over the opening a piece of bagging about 4 inches wide, covered with cement one-quarter inch thick, pass it around twice and tie it there. Then, after the ditch is dug out sufficient to make on the sleeve, we clamp it over the patch. We use, as gaskets for sleeves, thick asbestos paper, well softened with water. It makes a tighter joint with less strain on the bolts than can be had by the use of millboard, pasteboard, or red lead putty.

Discussion.

Mr. Neal—I see by the first "wrinkle" that Mr. Kelly uses the so-called cartridge system for enriching. I would like to know how he primes it.

Mr. Kelly—We break the coke up into small pieces, half filling the tube with it, then put in two quarts of oil, and fill up with coke. We let it stand half an hour or an hour before putting it in the retort to allow the oil to go into the coke in good shape.

Mr. Neal—How long do the tubes last?

Mr. Kelly—I have not melted or burned one out since last January.

Mr. Neal—What candle power do you obtain?

Mr. Kelly—I cannot tell that exactly. I have not any bar photometer at works. I should say it runs in the neighborhood of 18, by the jet photometer.

Mr. C. F. Spaulding—The last report of the State Inspector was 17 candle power.

Mr. Harbison—I would like to inquire whether Mr. Kelly has ever used coke for taking frost out of the street.

Mr. Kelly—Yes, I have used a coke fire, but found it worked pretty slow.

Mr. Harbison—What is the comparative cost?

Mr. Kelly—I cannot say as to that. Of course we carry the lime right back to the works and use it.

Mr. Neal—If you were near a sewer would it not be better to use lime than coke?

Mr. Harbison—I think that coke is better than lime, as, if I understand the wrinkle correctly, the first application of lime only takes out the frost to the depth of 3 or 4 inches; when you have to dig out 3 or 4 inches and then make another application of fresh lime. If you put on a coke fire at 5 o'clock in the afternoon and let it burn all night, by the time you are ready to go to work in the morning it will have taken out all the frost in the ground. That is my experience. I have taken it out to 20 inches, between 5 o'clock in the evening and 7 o'clock the next morning. I have done it in this present week.

Mr. Kelly—On the first application of lime it took the frost out to the depth of 3 inches only, but the lime was pretty hot at that time, and if we had let it stay there until morning all the frost would have been out. It would have required no care or watching, and no expense, during the night; and there was, of course, no danger from fire. We put on the second layer because we found that the first had not gone deep enough. The earth was very hard at that point. We let the second layer stay on over night, and in the morning the men went to work. It did not cost much of anything.

Mr. Harbison—My impression was that one application of lime would not be sufficient to take out the frost 20 inches in depth; but a coke fire that burns all night will be sure to do its work. It has never failed to do it with us. We have made some pretty severe tests of it. It needs no care after the fire is built; needs no watchman; and needs no light, because the burning coke makes sufficient light to keep people from driving over it.

Mr. Lamson—I do not know that I would really feel easy to have the men go to work on a leak in the street, build a coke fire, and leave it all night, to take the frost out. I think there would be danger of fire.

Mr. Harbison—Not at all.

Mr. Lamson—May not the gas in the pipe take fire and burn all night?

Mr. Harbison—No; the pressure in the pipe keeps the gas coming out of the ground all the time—there is no gas except at the surface. There is pressure on the pipe all the time.

Mr. Lamson—Then you would be burning gas all the time.

Mr. Harbison—Better to have it burn than have a leak in the neighborhood.

Mr. Lamson—I would be rather afraid that it would accumulate in pockets in the ground, or in the sewers; and thus you take the chance in such a case of exploding it by building a fire over it.

Mr. Harbison—I apprehend that that is largely a theoretical objection. In an experience of more than 25 years I have never had any such result as is suggested by Mr. Lamson to be possible. If there were pockets in the ground there might be trouble; but I do not apprehend that we have any leaks that are quite so bad as that. I have never had any reason to apprehend any danger; have never had any bad results; and have always applied coke to frozen ground. This application of heat on the surface is simply to take out the frost; and as it would be well on toward morning before the frost would be out of the ground, and before any gas would come to the surface where the fire was—there being a good deal of moisture in the ground, coming from the melting snow and frost, preventing the gas coming up through until the men began to excavate. I do not apprehend that there would be any danger.

Mr. A. C. Humphreys—Mr. Harbison takes such positive ground that I do not like to let his assertion go unchallenged. Mr. Lamson is one disbeliever and I am another. I have had cases under my direction where, if we had used burning coke to thaw the ground, we would have had very bad results; and my appreciation of the possible dangers saved me from disaster. I have one case in mind where I had given an order not to use fire (that came near being broken without knowledge of it on my part), and we afterwards discovered that there was in the immediate neighborhood a large cistern which was partly filled with gas, and probably might have been in the form of an explosive mixture. I would suggest that wherever gas will come to the surface and burn there is no saying that it will not follow along the line of the leak and reach some point where there may be sufficient air to assist combustion. We can never tell in streets that are cut through with sewers in what place the air can get to the leaking gas and assist in combustion. I think it is not a safe course to put fire on top of the ground when looking for leaks or repairing. I should say further that we have practiced the lime method in some places; and I think that Mr. Shelton,* in a paper before the American Association, showed some work that he had done in the upper part of Maine, where the frost was very deep, and where he succeeded in thawing the ground with but one application of lime.

Mr. C. F. Spaulding—I have had some experience in thawing out the earth. I have tried wood, charcoal, coke, and steam, but I have never seen anything work quite so well as lime. This application that Mr. Kelly speaks of was made with 2 bushels of stone lime, placed about 2 feet wide and 4 feet long. I will guarantee that if anybody will put lime on ground which is frozen 3 feet deep, putting the lime on at 5 in the evening, he will find in the morning that the ground is thawed out to a depth of 3 feet.

Mr. Neal—Do you leave it dry?

Mr. C. F. Spaulding—We moisten it. We put it on top of the ground, throw on water until it begins to slack, and then cover with straw. We never found anything else to work so well. I do consider it dangerous in many places to build a fire on top of the ground, for I have had gas explosions to occur in blind ditches, as the result of building a fire on the surface.

Mr. Harbison—My point was to find out whether more than one application of lime was necessary. The "wrinkle" said that two applications of lime were made; that after the first was made the earth was removed, and then another application made. My question was as to the relative expense of lime and coke. We do not very often have to make an application to find a leak; but we do occasionally have to put in a new service pipe in winter time to replace an old one. What would be the difference in cost? And will one application be sufficient? I can appreciate, as well as Mr. Lamson or Mr. Humphreys, the possible danger from fire igniting gas in crevices underneath the surface; but in an experience of many years we have never had an explosion from the ignition of gas below the surface of the ground caused by fire on the surface.

Mr. Kelly—I might say that it was not necessary to make two applications. Having made the first application, and as the gas was pretty bad in the house, we wanted to find out if we could stop the leak before dark, and so took up the lime. It was very hot when we took it up and it was then doing good work, and probably would have worked all night. It was not fit to put back again. We put on another because the first had not been on long enough. It was due to no fault in the method. I will add that I think the lime requires a very good wetting, so that you will have steam and warm water which will have a tendency to strike into the earth below. I do not think there is moisture enough in the frost in the earth to slack the lime.

Mr. C. T. Frost—I tried lime, and accomplished the object with one application. You should be careful not to give the lime too much water, because if you do it will not take the water out of the ground.

The President—I think that Mr. Learned, of Newton, has had considerable experience in stopping leaks.

Mr. W. A. Learned—In Newton within the last six months upwards of 50 miles of sewers were laid, and in that time we have had 109 leaks. We use steam for thawing the ground. For that purpose we have a vertical boiler on wheels. They locate the leak by drilling, then start up the steam boiler, drill some holes through the frost, and in about four hours we are through the frost and ready for action. As to the cost. I think we use in the neighborhood of 4 or 5 bushels of coke in the four hours. We can obtain a water supply from a hydrant at any place, which makes it very convenient for us. This "wrinkle" is not any invention of my own, for I have to thank Mr. Bill, of Malden, for giving the idea to me. The plan has proved beneficial to us; and if anybody has a large territory, and quite a number of holders outside that they want steam at, I would strongly recommend them to put a boiler upon wheels.

Mr. Bill—My experience is about the same as that of Mr. Learned. I have used a boiler in that way for 8 or 10 years, and with very satisfactory results. Our boiler is about 6 feet in length and 2 feet in diameter.

(On motion of Mr. Lamson a vote of thanks was given to Mr. Kelly for his paper.)

QUESTION-BOX.

The President—The Secretary has a few questions which we will have read next.

"I.—If you had a mile of 6 inch main to lay, would it be cast iron with leaded or cement joints, or wrought iron with screw connections?"

Mr. Harbison—I think Mr. Egner, of all the gentlemen present, is best capable of answering that question.

* See discussion on Mr. D. H. Geggie's paper on "Experience in Distributing Gas under Extremely Low Temperatures." Mr. Shelton's remarks are to be found in issue of Nov. 2, 1888, p. 515.

The President—We shall be happy to hear from Mr. Egner.

Mr. Egner—I am not a member of the Association, but only here by invitation, and would not like to trespass upon your time.

The President—That makes no difference. We are all a happy family here.

Mr. Egner—I have had some experience with wrought iron mains at St. Louis. We had several miles of it; and in New York I think there are very nearly 100 miles. It depends very much upon the kind of soil that the main is laid in. In a good clay soil I would lay wrought iron pipes with screw joints, because then it would certainly remain tight. There would be no leak from it. But if it is a mixed soil I would lay cast iron pipes, with cement joints—say half a dozen cement joints every six lengths, and then a leaded joint.

The President—I would inquire whether, in streets filled in with coal ashes, Mr. Egner would prefer galvanized or cast iron pipe.

Mr. Egner—I would put in cast iron pipe. I would not trust galvanized pipe where ashes are abundant. They have the sort of pipe known as "kalomein," which lasts very well, but in ashes I would not trust anything as I would cast iron pipe. The cost of laying wrought iron pipe is not very much greater, and in most cases a good deal less than that of cast iron pipe. Wrought iron pipe can be laid generally with smaller cost, and it can be made almost absolutely tight. In the Company I spoke of, with 138 miles of main, there was not over 2 per cent of leakage on the entire system, and much of that was due to the 30 odd miles of cast iron pipe, which they had. On another 12-inch line, which I have in mind now, extending 3½ miles from one station to another, there was no leak at all, or we never discovered any. I certainly would not lay any wrought iron mains if they had to go through ashes. If the soil was good I would put them in.

The President—In connecting supply pipe with wrought iron mains you find no difficulty on account of the thickness of the pipe?

Mr. Egner—No. A band can be put around the pipe. A hole is drilled in the pipe and the band put over it.

The President—You do not trap directly through the pipe?

Mr. Egner—There is a thread or so on the pipe itself, but the main thread is in the band that is put around it.

The President—We would like to have Mr. A. C. Humphreys answer this question.

Mr. A. C. Humphreys—It it too large a question to be answered directly. It is very much as Mr. Egner says; you will have to consider the conditions. It depends upon the soil. I am not very much of a believer in wrought iron pipe in any case. I think the chances are so strong that you will meet with some bad soil in the line of any extension that the laying of wrought iron pipe should not be hastily decided upon. I feel that the security in cast iron pipe against rusting more than compensates for the greater risk as to leakage. I think that the leakage from cast iron pipe will very much more favorably compare with wrought iron pipe than is usually supposed if every precaution is taken in laying the cast iron pipe.

Mr. Harbison—I think one important point in connection with it is the duration of the pipe. Our experience is that in mixed soil wrought iron pipe will not last more than an average of 25 years. I do not know how long cast iron pipe will last. I was very glad to know from what Mr. Egner said, that the works to which he alludes had gotten along down so near the Connecticut standard as represented by Brother Nettleton, in respect to the question of leakage; although I think that Nettleton is still a point or two ahead of him.

The President—We shall be pleased to hear from Mr. Nettleton, not only with regard to leakage, but as to his opinion as to the respective merits of wrought and cast iron pipes.

Mr. Nettleton—I can say but little on that subject. I have recently, acting on the advice of some friends in the West, bought a few thousand feet of three, four and six inch pipe, but it is in the nature of an experiment, and I shall not use it where there is any chance of the soil injuring the pipe. Some friends have used wrought iron and steel pipe for years, and report that they have had practically no leakage at all, but they have not used it long enough to determine its life.

Mr. Lamson—I might as well say that this question as to the relative merits of wrought and cast iron pipes was discussed here once before; and that I then made a statement which I will now repeat: Wrought iron pipe is perhaps better fitted for use in outlying districts than in cities. We all know that certain soils affect wrought iron pipe which do not materially affect cast iron pipe. It is also to be considered that in cities the urine of horses very materially affects wrought iron pipe, and that fact ought to be taken very seriously into consideration. For the most part the soil in cities is unfit to lay wrought iron pipe in, and largely for the reason that the soil is so thoroughly saturated with the urine of horses.

Mr. C. F. Spaulding—I have had some experience with cast iron pipe. When I went to Waltham I found there a pipe of about 150 or 175 feet in length, which was hung up under the bridge. At that time its use had been discontinued. I looked the matter up, and saw that it was shut off on both sides, for the reason that the contraction in cold weather had pulled it apart in the center. I took up a few planks on the bridge, examined the pipe, and found that the ends were about half an inch apart. It was a 6-inch pipe, and it had stripped the thread. Perhaps in a soil where the earth is frozen very deep, that might be an objection to wrought iron pipes. The contraction might pull out the joints and thus cause greater leakage than would be the case if cast iron pipe was used. In this case I wanted the use of that 6-inch pipe across the bridge, so I got a piece of 8 inch wrought iron pipe, 2 feet long, then I raised up one end of the 6 inch pipe, slipped it over and slipped it back, thus making a sleeve for the 6 inch pipe. Then I got a lot of rope yarn and melted a lot of tallow, put it into a kettle and saturated the yarn thoroughly with it. Of course when it had cooled it was very stiff. Then that yarn was driven in a foot on either side, making a stuffing box. That wrought iron pipe has now been there for two years, and I have not yet discovered any leak. It goes and comes as it pleases in this wrought iron sleeve, and it works admirably.

"No. II.—What ought to constitute an average yield of tar per ton of coal carbonized?"

The President—I suppose that Mr. Harbison knows and can tell us all about that.

Mr. Harbison—Answering for myself, I must say that we have not had practical experience in that, as for many years we have been using a large quantity of tar ourselves in making concrete walks, etc., of which I have kept no record; and, therefore, I do not know what yield I have had per ton of coal carbonized.

Mr. Nettleton—I have figured the production of tar for years on a basis of 14 gallons to the gross ton of coal, and on that basis I sell more than I charge up. Probably the yield at the works in my charge is between 14 and 15 gallons.

The President—I believe that Mr. Macmun, of the Natick Gas Company, has had some experience in this, and we shall be glad to hear from him.

Mr. Macmun—At the present time I have not got any data with me, but I shall be pleased to read it at a future time.

Mr. Gifford—I think we get about 17 gallons to the ton.

Mr. C. F. Spaulding—What is the yield per pound of coal?

Mr. Gifford—From 4.80 to 4.85.

Mr. C. F. Spaulding—As far back as 1865, or 1855, when I first commenced making gas in iron retorts, we used to average from 22 to 25 gallons per ton—pretty much all tar.

The President—You were making tar then?

Mr. C. F. Spaulding—Yes; we used to make tar at that time. I have tested the matter pretty thoroughly in the last two years, and find on the average that the yield does not vary much from 5 feet to the pound—perhaps 5.05 during the year; and our average of tar per ton of coal (figuring our coal by the short ton of 2,000 pounds) is about 14 gallons.

The President—Will Mr. Snow give us any information on this subject?

Mr. Snow—In the last two or three years we have had a chance to measure our daily make, as we have had our wells emptied and pumped each morning, and could thus tell what had been made in the last 24 hours. For two different seasons, for a period of some time (I cannot say how long) we averaged fully 18 gallons per gross ton.

Mr. W. A. Wood—The average figures, covering a number of years, at the North End station of the Boston Company showed a very close average of 16 gallons to the gross ton; and the make at the Commercial Point Station, with all regenerative furnaces, will average year in and year out about 14 gallons to the ton. We find about that difference between the best forms of the old-fashioned furnace and the very best forms of the regenerative furnace. Without trying to get too much out of the coal, there will be a difference of about 2 gallons of tar to the ton of 2,240 pounds.

Mr. Sherman—We have no account of the tar except that which we sell. We do not look over the barrels very closely. We call a barrel 50 gallons, and we sell 15 gallons to the ton of coal carbonized. That is what we sell and get paid for.

"No. III.—How many thousand feet of gas, under favorable circumstances, ought a bushel of stone lime, slacked, to purify?"

Mr. Egner—I have purified 22.000 feet, under favorable circum-

stances, to the bushel of stone lime, counting 80 pounds to the bushel. I mean 80 pounds of unslacked lime. It depends largely upon what kind of coal you are using.

Mr. Fowler—We purify from 15,000 to 19,000 feet to the bushel of unslacked lime. We use Westmoreland coal, and we enrich with crude Lima oil.

Mr. C. F. Spaulding—Last year we purified 6,550 feet per bushel of lime; but a bushel of lime of the kind that we have will make four bushels when slacked. I tried it not long ago for the purpose of satisfying myself on some new lime that I bought. I wanted to see how it compared with other lime; so I measured up a bushel of stone lime (or an even 100 pounds), and I found that it quadrupled. That is, I got four bushels of slacked lime from one bushel of stone lime. That averaged over 5,500 feet per bushel.

Mr. Sherman—How many pounds do you count to the bushel?

Mr. C. F. Spaulding—When I tried the experiment it was with 100 pounds. I have a square box which holds a bushel, but we can very easily get 5 or 6 pounds more or less of stone lime in it; but when it is slacked I just scrape it off roughly and give an exact bushel as near as I can get at it.

Mr. Sherman—What is the standard for a bushel of stone lime in weight? Is there any standard, or is it an arbitrary one which each dealer puts upon it?

Mr. C. F. Spaulding—I don't know that I ever heard what the standard bushel is.

Mr. Sherman—I have been buying at 70 pounds. If anybody is giving 100 pounds to the bushel I would like to know it.

Mr. C. F. Spaulding—A bushel of stone lime of the kind that I am using will slack up to 4 bushels.

Mr. Sherman—And you call that 100 pounds?

Mr. C. F. Spaulding—You may call it what you please. I measured it; but I say that I also weighed it, and it weighed 100 pounds.

Mr. Sherman—Is the bushel heaped up or struck?

Mr. C. F. Spaulding—It was struck, as near as you could strike it with broken chunks. I calculated to have a bushel anyway.

"No. IV.—Is 38 bushels per ton, and 42 pounds per bushel, an excessive yield of coke per ton of coal carbonized, an overweight for a bushel of coke?"

Mr. Egner—What kind of coal? We know that some coal will make more and some will make less coke. I will say that with the Youghiogheny gas coal (which is the kind of coal which we used when, as I mentioned before, we were purifying 22,000 feet of gas per bushel of lime under favorable circumstances) we get 38 bushels of coke, and when the coke was as dry as we could get it we called 36 pounds a bushel. It weighed a little less. It weighed between 35 and 36 pounds, when measured; but we sold it at 36 pounds to the bushel. I have got as high as 45 bushels with some other kinds of coal, and as low as 32 bushels with still other kinds. So that it is very necessary, in order to answer such questions, to know what kind of coal is referred to.

Mr. Wood—Was the coke weighed hot or cold?

Mr. Egner—It was weighed hot—just quenched with as little water as possible. I have had that done many times to be sure that our coke pile was coming out right.

The President—A number of years ago I made some careful experiments with a view to writing a paper on this subject. I have not the figures with me, but my impression is that we made 42 bushels of coke per ton carbonized, and that the coke weighed about 38 pounds to the bushel. That was weighed hot, just as it came from the retort, and without any water being put upon it. That was the gross ton.

Mr. Egner—Mine was the short ton.

"No. V.—What amount of tar is made in the manufacture of water gas per 1,000 feet, and what is the proportion to amount of tar made in coal gas?"

Mr. Neal—Seven-tenths of a gallon.

"No. VI.—Will water gas consume as fast as coal gas, other conditions being equal?"

The President—The general opinion seems to be in the negative.

"No. VII.—Will water gas consume faster than coal gas in running a gas engine, other conditions being equal?"

Mr. Jenks—I think there is but little difference. I have used straight coal gas, straight water gas and also a mixture, and I think there is very little difference. I do think there is rather more efficiency in water gas.

Mr. Prichard—I presume you mean ordinary illuminating water gas. I have experimented and find that it is substantially the same.

Mr. Jenks—I presume the question refers to ordinary water gas?

Mr. Prichard—I presume so; but when we use straight water gas the conditions are different.

Mr. Gifford—My opinion is that it depends largely upon the amount of air required for the combustion of the gas. Richer water gas takes more air, and so less gas is required to run the engine.

Mr. Prichard—"The conditions being equal," would mean of equal illuminating power.

The Association then adjourned to Thursday, Feb. 18, at 10 A. M.

SECOND DAY—FEBRUARY 18—MORNING SESSION.

The Association met at 10:30 A. M.

AN EXPRESSION OF SYMPATHY.

Mr. Nettleton—As some of you are aware, within a short time Col. Stedman has lost a member of his family under very peculiar and trying circumstances. I think it would be very appropriate to send a telegram, extending to him an expression of the sympathy of the Association in his great loss, and I move that a committee be appointed to send such a telegram to Col. Stedman.

The motion was seconded by Mr. Stiness and carried.

The President appointed Mr. Nettleton and Mr. Stiness as such committee.

CONFERENCE COMMITTEE ON STANDARD CASTINGS.

The President—At our meeting yesterday Mr. Slater read a communication from the Society of Gas Lighting in regard to establishing a uniform standard for fittings, and a motion was passed that a committee of three be appointed to co-operate with like committees from the other Associations. I will appoint on that committee Messrs. Nettleton, Prichard and Harbison.

Mr. Nettleton—I do not understand exactly the conditions under which this committee are appointed. Are we to report at the meeting next year, or in case the tables submitted are satisfactory are we to agree that they shall be adopted as the standard by the New England Association?

The President—The understanding I had from what was said with regard to the matter was that we were to confer with the other committees and report at the next annual meeting of the Association. I do not know that the Association is quite prepared to take definite action without looking into the matter a little more thoroughly.

Mr. Stiness—I think that the Society of Gas Lighting, which originated this movement, have not yet taken any definite action.

Mr. Nettleton—They have gone over the matter quite carefully. In the first place, the plans, details and sizes were gotten up by a committee who may fairly be considered to be experts, and their report has been adopted by the Society of Gas Lighting. I think it will be found that there is very little to criticise in these plans. Of course if the New England Association adopt them it does not bind the members to use these sizes. On the other hand, the chances are that the larger foundries through the country will change their patterns to the standard, provided that standard is adopted by the leading Associations; and in case they do change their standard, then we will all use the same kind of fittings throughout. If agreeable to the Association, I think they would run no risk in giving more power to the committee.

The President—Nothing was said in the motion for the appointment of the committee about approving or adopting the recommendations contained in the communication. My own idea was that it was simply by way of conference, and that a report was to be made at a future meeting.

Mr. Stiness—I think that that would be the better course.

The Secretary read an invitation to visit the exhibition of the Gas Appliance Exchange.

(To be continued.)

Trying to Save the Gas.

The *American Manufacturer*, in commenting on a meeting held recently at Lima, Ohio, for the consideration of means to prevent the further waste of natural gas in that district, says the meeting was attended by representative citizens from all the towns in Ohio where natural gas is used. A bill was framed, which, if adopted by the legislature, will prevent the waste of gas in the Ohio field. While such a move is most commendable, and will, doubtless, result in preventing any further great waste of the natural fuel, it should have been started sooner, and at this time it seems somewhat like an effort to lock the stable after the horse has been stolen.

The history of the gas development in Ohio differs but little from

the records of other districts where the new fuel came in overwhelming plenty, was used without care for the present or thought for the future. New towns sprang up, and old ones were given new life. Manufactories were established in localities where natural gas was about the only natural advantage. Free sites and free fuel were inducements that attracted numerous enterprises. Meanwhile, in addition to supplying these factories, the cities, towns and individuals used gas as though they thought the supply was inexhaustible. It flared up night and day, showing how wasteful men can be in the use of nature's gifts.

In time, however, a marked diminution in the supply frightened the users into something like economical methods, but still the amount of fuel expended was out of all proportion to the results obtained. Even at the present time it is stated that there are hundreds of wells where the gas is used for lighting the whole farm where the well is located, and the gas is burned day and night continuously. This seriously interferes with the supply of fuel gas in a number of towns, hence the movement toward a restriction of this waste.

Other districts in which natural gas has appeared or is being searched for should learn a lesson from those regions where it is waning. To get the full benefit of natural gas, a community should begin its use economically and not wait until the failing supply gives warning that it should be made the most of, and every means taken to prolong its flow.

The Origin of Petroleum

R. Zaloziecki, in the *Chemiker Zeitung*, disputes the hypothesis of Ochsenius concerning the origin of petroleum, the chief features of which are the assumption that the formation of petroleum has been brought about by the action upon the fatty matter of decomposing animal remains of certain salts, notably alkaline, bromide and aluminum chloride, and the contention that this view is borne out by the composition of the saline constituents of the natural waters commonly found associated with petroleum. The chief grounds for his rejection of this theory are that petroleum and the said saline deposits belong to different geological epochs, and that little or no nitrogen, in any form, is found in the waters accompanying deposits of mineral oil. Moreover cases are known in which the water accompanying petroleum is free from saline constituents; and further, the synthesis of hydrocarbons of the aromatic series effected by the aid of small quantities of alkaline bromides and iodides and aluminum chloride take place under conditions widely differing from those that would occur in the production of petroleum in contact wih an aqueous solution of these bodies. In consequence of these considerations he adheres to his belief that the function of the saline constituents of waters accompanying petroleum has been rather to restrain the putrefactive changes of the original animal matter than to cause a specific alteration of its fatty constituents into hydrocarbons of such series as are generally found in crude petroleum.—D. W.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. John B. Taylor, who it will be remembered was actively identified with gas interests of St. Louis for many years, has been elected President of the Coddington Painting and Decorating Company, of St. Louis.

It is with sincere regret that we report the death of Mr. Ezra H. Parker, Secretary of the Norwalk (Conn.) Gas Light Company. About a year ago Mr. Parker was prostrated by influenza, and the attack was so severe that a permanent or organic affection of the heart was developed. He was very much respected by his fellow-townsmen. The remains were interred in Riverside Cemetery.

The gas rate in the Montclair (N. J.) district has been reduced to $2.10 per 1,000, net, a concession of something like 20 cents per 1,000.

Colonel M. J. Payne, President of the Kansas City (Mo.) Gas Light and Coke Company, after a somewhat prolonged campaign, the center of which was laid in Cincinnati, O., finally brought the enemy to an unconditional surrender. Mrs. G. N. Chamberlain was the besieged, and a fairer enemy was never encountered.

At a meeting of the Board of Directors of the United Gas Improvement Company, held at the home office on February 26th, a letter was read, from Mr. William G. Warden, dated at Paris, stating that on account of ill-health and probably prolonged absence from the United States, he desired to be relieved of the responsibility of the Presidency of the Company, and that he decided to nominate Mr. Thomas Dolan as his successor. With great regret the Board accepted Mr. Warden's resignation as President. He will continue, however, to be a member of the Board of Directors. The following appointments were thereupon made: President, Thomas Dolan; First Vice-President, George Philler, Second Vice-President and General Manager, Samuel T. Bodine; Third Vice-President, Randal Morgan.

We are indebted to a correspondent, who formed one of the party from the New England Association of Gas Engineers that visited the Allston plants of the Brookline Gas Light Company's works, on the afternoon of the second day of the meeting, for the following condensed description of the plants. The reason for withholding this description (which came to hand on February 19th) was our desire not to forestall in any particular the paper* read by Dr. Amory before the Association respecting the new works of the Brookline Company. Our correspondent wrote: "A brisk ride of perhaps 1½ hours brought us to Allston, where the Company has certainly put up a works that is a credit to its proprietors. Entering the main appoach we came to the offices of the Company, located in a building 140 feet by 40 feet, and 2½ stories in height. The building also covers the storerooms, workshops, carriage house and stables. Next is the retort house, 90 feet by 64 feet, and 2 stories in height, with working floor above. The house contains 12 benches of 6's, heated by Flemming half-depth furnaces, and provision is made for 4 more benches. The coal shed, which is to the rear of the retort house, is on the ground level, the coal being raised by hydraulic elevators to the working floor of house. The two exhausters—very handsome specimens, indeed—with valves, piping, etc., are arranged in a very convenient and large room. The condensers, tar extractors and scrubbers are next in line, following which is the purifying house arranged for eight 16 feet by 20 feet boxes, to be operated by the valve system. Next comes the meter house, the space being mapped out for two meters (each rated to supply 750,000 cubic feet per diem), one of which has been completed. Next is the governor room, following which is the holder, which rests in an iron tank above ground. The finish of the structures and the apparatus, and the alignment of the latter as well, cannot fail to impress the beholder. In the electric annex well constructed buildings house a boiler room with provision for a battery of 8 boilers, 4 of which are set. The dynamo room holds one 500-horse power engine (to be supplemented by one 150-horse and one 100-horse power engines, respectively), from which line shafting will ultimately drive 8 arc and 3 incandescent dynamos. The plants are a credit to the Company and to the constructors as well. I may add that the visitors enjoyed more than the mere looking at the Company's solid equipments.—S."

The Knights of Labor have determined to take a hand in bringing the manufacture of gas to the control of the municipal authorities, so far as Chicago is concerned. The master workmen of the Windy City have sounded their little tin horns to this strain before now, but so far with indifferent success. However, the "masters" of Pullman, not cast down by the meager results so far achieved by their co-partners at Chicago proper, will try their junior toot, the preliminary bars of which were piped something like ten days ago at Pullman, and the score of the same was written, thus:

Whereas, The Knights of Labor have for years been endeavoring to bring the question of municipal ownership of public works into the arena of politics, and,

Whereas, Certain public spirited citizens of Chicago have finally revolted against the extortions of the gas trust. Therefore, be it

Resolved, That Local Assembly 4,263 K. of L., send greetings of sympathy and support to the promoters of this movement, looking towards the establishment of municipal gas works, and pledge ourselves to do all in our power, either at the polls or elsewhere, to advance the project to a successful issue; and be it further resolved that we shall call upon our fellow organizations throughout the city to take up this important issue and aid in relieving the people from the impositions of the gas monopoly.

Mr. George Nelson, Superintendent of the Morris (Ills.) Gas Company, was in Chicago recently, visiting various furniture shops. It seems that he was looking up the matter of cribs—one that would comfortably accommodate a 12-pound boy, that gives promise of becoming much heavier.

It looks as if the Syracuse (N. Y.) Gas Light Company was about to extend its plant again, judging from a proposition recently made by Mr. Wood, which asked for proposals from local contractors for the purchase and removal of a block of brick houses on Wallace street on lands owned by the Company. Holder room likely is being provided for; but this is merely a guess on our part.

The Middletown (Del.) Electric Light Company has made an assignment.

* See p. 326.

A CORRESPONDENT, writing in this city under date of February 26, says: "To the Editor AMERICAN GAS LIGHT JOURNAL: In reading the President's address to the members of the New England Association, I was particularly struck with his remarks in reference to the extended use of gas for cooking and heating purposes. He has undoubtedly struck a keynote that should be taken up by every gas company in America, and if gas companies would give facilities for the hire and purchase of gas heating and cooking stoves, instead of cutting each other's throats by opposition, it would very much tend to their advantage and to that of their consumers. As a first step the price of gas must be reduced, which would be followed by increased consumption; this fact is incontrovertible, and cooking and heating stoves should be one of the features of the Chicago Exhibition. Stoves of all descriptions should be on view at all offices, with a thoroughly competent man in charge to demonstrate the undoubted superiority of gas cooking stoves over the old method. The companies should fix these stoves at cost price, charging a rent for the hire of stove; facilities should also be given for the hire-purchase of same. The introduction of stoves must be brought before the consumer's notice by means of advertising. An admirable way is on the back of accounts that are rendered to consumers. By this and other means a large London Company with which I was connected increased its sale in 5 years from 3,000 stoves to 24,000. This result speaks for itself, and President Allyn deserves the thanks of all interested in the combustion of gases."

WHEN our correspondent has become somewhat more familiar with the practices of American gas companies he will find that their managers have long since adopted the plans that he proposes, and that they have made great progress in popularizing and so extending the sale of gas for purposes other than illumination. In the meantime we agree with him that President Allyn's remarks are cogent and forceful.

MANY of the gas consumers of the Hyde Park district of Chicago have recently been imposed upon by sneak thieves, who effected an entrance to the dwellings by representing themselves to be gas meter inspectors. Some lost valuable silverware, jewelry and so on; but the losers have only themselves to blame, as the gas company's inspectors are equipped with badges, which they are obliged to show on demand.

THE Lawrence (Mass.) Gas Light Company was to have sold 300 shares of treasury stock on Saturday last. The last reported sale was made on Nov, 11, 1891, when 142 was paid for a block. The dividend rate is 8 per cent. per annum.

LEAVE has been asked to incorporate the Baltimore County (Md.) Gas Light and Fuel Company. The incorporators are Messrs. W. T. Cox, C. B. Taylor, J. D. Phillips, James B. Jones and J. L. Miller. The Company is capitalized in $250,000. The understanding is that the first plant will be constructed at Highlandtown, with power and purpose to either pipe to or build in the adjoining districts.

A BRANCH of the Archer process combination is said to be operating at Newark, N. J., somewhere on Johnson street. They are anxious to secure a lighting contract on public account, but the probability is that they are in reality hunting for capitalists who do not know much about gas or gas making. Public lamps at $5 each per year and gas to ordinary consumers at 50 cents per 1,000 is their battle cry; but the capitalists seem to be rather chary. We forgot to mention that the Archer product as shown at Newark is purified "by a secret process."

THE Berlin Iron Bridge Company, of East Berlin, Conn., is running its plant on "full time" these days. In fact, the orders are crowding the place, which would go to show that its new works was not completed any too soon. Besides the contract for the building of the True Blue Marble Company, of West Rutland, Vt., which was noted in our last, the Company is now engaged on the following contracts: An iron building 52 feet by 170 feet, for the Chester Pipe and Tube Company, South Chester, Pa.; a boiler shop 68 feet by 201 feet., and a machine shop 72 feet by 184 feet, for the Dry Dock Engine Company, at Detroit, Mich.; a boiler shop 115 feet by 370 feet, for the William Cramp & Sons Ship and Engine Building Company, at Philadelphia; all the iron work, including the beams, girders, roof, etc., for a new building which is being put up at Hartford by the National Fire Insurance Company; an iron boiler house for the Montgomery Furnace, at Port Kennedy, Pa., a new casting shop, 69 feet by 167 feet, for the American Tube Works, at Somerville, Mass.; and also a large roof for the elegant new residence of Mr. Joseph D. Potts, at Wyebrook, Pa. In its bridge department the Company reports unusual activity. Several bridges are being constructed for the N. Y., N. H. & H. Railroad Company, besides a number of highway bridges in different parts of the country. The contracts just completed include a large iron building for the Delaware Iron Company, at New Castle, Del., and also a huge iron structure for the Boston & Montana Consolidated Silver and Copper Mining Company, at Great Falls, Montana.

NORTH KNOXVILLE, Tenn., is in trouble over its public lights, which are of the arc electric sort. Some time ago the Knoxville Electric Light and Power Company agreed to furnish 1,200-candle power arcs, on a partial moontable, on the basis of a payment of $8.33⅓ each per month, the charge for 2,000-candle lamps to be $10 each per month. This contract expired on March 1st, and a week or so prior to the expiration of the contract the Company notified the authorities that it would be compelled to ask an increase to $10 and $12 each per lamp, respectively, on a renewal of the contract. The City Council came together and decided not to pay the advanced rate, and resolved to call for proposals for other means of lighting. The Council also empowered the Mayor to say whether or not the Company's poles and wires should be removed from the streets.

IT is said that the stock remaining in the treasury of the Hyde Park (Chicago) Mutual Fuel Gas Company was all subscribed for by the present owners of the Company at the figure of $110 per share. The issue was $83,000, which brings the capital issued to a round half million.

"WESTERN OBSERVER," writing from Chicago on the 29th ult., says: "The Keystone Meter Company, of Royersford, Pa., has opened a Western office in the city of Chicago, and Mr. C. V. Newman, formerly with the Maryland Meter and Manufacturing Company, has been appointed Manager. Comfortable quarters (rooms 1434 and 1435) have been secured in the new Unity Building, on Dearborn street, between Randolph and Washington streets, right in the very center of the business district. A suitable stock of meters, supplies, etc., will be kept in store, so that immediate shipments for Western delivery can be counted on. Mr. Newman needs no introduction at my hands; suffice it to say that his knowledge of the business is such that one may take it for granted that the interests of the Keystone Company in the West will not suffer under his management. His many friends will wish him a full measure of success. The Keystone Company is, as was noted in the JOURNAL some time ago, manufacturing a thoroughly standard Glover meter, equipped with the Hearne improved valve attachment. In thus reaching out to cover an extending business, and to better handle its Western trade, progressiveness is evidenced; hence it is likely that amongst the Western meter agencies it will not be the hindmost."

AT the advice of Mr. R. B. Eastman, the architect in charge of the construction of the Kings county public farm buildings, Kings Park, Suffolk county, L. I., the lighting of the structures will be performed by means of incandescent electric lamps. The tenders of the plant were to have been opened on Thursday last.

MR. DORR E. FELT, of the Meter Register Company, No. 52-56 Illinois street, Chicago, Ills., writing to the JOURNAL under date of 1st inst., says: "Among the Items of Interest in your issue for February 29th, I find the following: 'The plan of employing students, medical or otherwise, to take the statements of the gas meters in use in Chicago, has resulted in failure—partial, if not complete. The students, it seems, hit upon a plan last quarter for averaging the consumption, and the result was a howl that made even the Windy City ring.' As one who has given much time to the study of this evil, allow me to say that it was not particularly in the last quarter that the 'students' hit upon the plan of averaging the consumption. The Chicago *Tribune* of February 16th quotes Secretary Wooster, of the Chicago Gas Light and Coke Company, as saying 'that it is an old story to people on the inside.' At first thought it would seem remarkable that such a general complaint could arise from improper reading of meters in one particular month, but the explanation is this: The meter readers who resort to the averaging of statements are smart enough to know that if they should get the reading too high the consumer would be apt to observe the discrepancy between the amount stated on the bill and the actual readings of the meter and make a complaint, and, consequently, the Company would discover his negligence. But, on the other hand, if he gets the reading too low, and the consumer notices that the discrepancy is in his favor, the consumer will say nothing about it; therefore the meter readers make it a point to keep the readings considerably below the actual readings of the meters,

knowing thereby their negligence will be less liable to be discovered by their employers. Unless the meter readers are sent out with a route book in which the readings of previous months are entered to furnish him data from which to calculate, he has actually to go to the meters and take the readings, and finally, after several months of averaging, when he actually again reads the meter the consumer is called upon to pay for the quantity of gas which the meter reader had fallen behind in the true consumption during the period of his averaging. In January the Chicago Gas Company sent the statement takers out with new route books in which there were no readings of previous months, therefore the statement takers had to actually go to the meters and take the readings, and the consumers were called upon to make up the difference between the actual previous readings of the meters and the readings which had been estimated below the actual figures by the meter readers in previous months. As a rule, where complaints are the result of statements being averaged by lazy meter readers, it is not the month or months in which the readings have been averaged that the consumer makes his complaint, but it happens or is entered when the actual reading has been taken.

MESSRS. D. MCDONALD & CO., of Albany, N. Y., have opened branch shops in this city, the location being made at 154 West 27th street. This looks as though the genius of this distinctively New York meter manufacturing house is not willing to be pent up in "Albanee." May his shadow never grow less.

The plant and entire possessions of the Rock Island County (Ills.) Brush Electric Light Company were recently sold at auction by the Receiver, Capt. T. J. Robinson. It was bid in by General Manager Hammond, of the Brush Electric Company of Cleveland, at the price of $10,500. The defunct Company was organized in 1882, and local capital to the amount of $45,000 has been sunk in the enterprise.

RIGHT on top of this comes the news that what is known as the Davis' Merchants Electric Light Company, which supplies electric currents to Rock Island and Moline, Ills., and to Davenport, Iowa, was badly damaged, if not totally destroyed, by fire. As the works were engaged in keeping up the public lighting of Rock Island, the city was plunged in darkness, and much inconvenience was experienced by ordinary users. The fire was caused by a "short circuit" in the dynamo that kept up the Moline supply.

ON the 26th inst. a small lot of stock in the Consumers Gas Light Company of Toronto was sold at $180. This is an increase of 15 points in the last three months.

The Electrical Exhibition at St. Petersburg.

Engineering says that the Electrical Exhibition in the Russian capital, which was opened with considerable ceremony on January 30, contains a great many items of interest. It was the original plan that the Exhibition should have been opened at an earlier date, but even as it was, many of the exhibitors were not nearly ready. On the other hand, it is due to their enterprise, and to that of the Technical Society, that the Exhibition has been arranged without any State subsidy. The Exhibition covers an area of 2,720 square meters, and contains a great many novel and interesting exhibits. The greater portion of these is arranged in three large rooms, which are profusely illuminated by the hundreds of electric lights. Among the 130 exhibitors Messrs. Weyher and Richmond attract the lion's share of attention with their 150-horse power compound steam engine, which was favorably noticed at the Moscow Exhibition. The famous Nobel firm is represented by several high-speed steam engines specially intended for dynamos. One of the their engines, a triple-expansion, running at 350 strokes per minute, is worked by steam from a boiler which is being heated with naphtha. The same firm is also showing a petroleum motor which works a smaller dynamo, several boiler fittings, etc. In the adjoining room Siemens any Halske occupy the principal position, without, however, appearing to be showing any special novelties. A collection of izolite in tiles or squares of about a meter length, and in thicknesses ranging between 7 and 40 millimeters, is also deserving of notice, and there is no doubt that it affords an excellent pavement in places where there is a great deal of wear and tear. The Benardos process for electric soldering is illustrated in various ways, and a church bell in which a hole has been repaired in this manner has quite preserved its ring. The third room is principally occupied by appliances for electric lighting, chandeliers, lamps, switchboards, transformers, galvanometers, electric meters, automatic rheostats (Blattig system), etc. The State telegraph and postal authorities have also an interesting collection of various telegraph and telephone appliances. In addition to the three large rooms there are several smaller ones, one of which contains what has been published in the Russian langurge about electricity, another is used for phonographic experiments, etc. It had been expected that the Exhibition would have met with more support; it would have done so had Edison, as was once spoken of, put in an appearance. It will remain open till the middle of March.

Modern Gas Engines.

At the last ordinary meeting of the Leeds (England) Association o Engineers, a crowded attendance of members met to hear Mr. W. Norris, of Lincoln, read a paper on "Modern Gas Engines." The president, Mr. T. Craister, occupied the chair, and after the usual preliminary business and election of new members, he briefly introduced the lecturer. Commencing with the discovery of coal gas, Mr. Norris rapidly traced the progress of the gas engine from the earliest known types, the Barber engine of a century ago, Street's and Barnets. The latter, in 1338, introduced compression of the explosive mixture before explosion, *i. e.*, 38 years before Dr. Otto. The Lenoir gas engine, patented in England in 1842, was very fully described and illustrated by diagrams. This was a three-cycle engine, having an explosion every third stroke, and it was said to only consume 44 cubic feet of gas per indicated horse power. The Otto-Langen free piston gas engine was described, and results of several practical tests were given with diagrams. The Otto gas engine next came in for full description, which was copiously illustrated with full-sized drawings and diagrams. Dr. Otto's stratification theory was discussed, the lecturer disagreeing with the learned doctor, and he supported his views by an ingenious apparatus, in which a piston working in a glass cylindrical vessel represented the piston of the gas engine.

Speaking of the Otto engine, the lecturer said: "The late Dr. Otto's name is known all over the civilized world as the inventor of the first economically and commercially successful gas engine. In fact, he may be called the inventor of the gas engine in the same sense, and with as much truth as James Watt is commonly called the inventor of the steam engine." By using the four-stroked cycle, Dr. Otto succeeded in using the motor cylinder as the compressor, and he arrived at a simple construction of engine ingeniously designed in many of its parts, and which has substantially remained the same during the 16 years which have elapsed since its introduction, and most inventors who have been unaware of the simplicity of the four-cycle engine, after lamentable errors, accompanied by waste of time and money, have ultimately adopted the Otto cycle. The Atkinson engine was also described and spoken of as the most economical engine in the market, as regards its gas consumption. The Robey gas engine (Richardson and Norris's patent), which was illustrated by an engine in motion, which was the smallest engine made by Mr. Robey, and also illustrated by complete full-sized drawing and diagrams of a 9 horse power (nominal) Robey engine. The safety combination and means for delaying the time of ignition consists of a small screw, which permits of the engine being adjusted for high or low speeds. A peculiarity of the Robey gas engine is that it can be made to run in either direction in a few seconds. The measured drop lubricator was fully described and illustrated. The efficiency of gas engines with gas varying from 813 down to 620 British thermal units, was given in a tabular form. The practice of selling gas engines by nominal instead of brake or actual economical working horse power, was strongly condemned. Speaking of the gas engine of the future, the lecturer looked for economy in a hot cylinder, and a regenerator in some form or other. "The Theory or Thermo-Dynamics of the Gas Engine," will be treated next session.

The speaker resumed his seat amid great applause, and the president, Mr. Craister, invited discussion, and said the gas engine was undoubtedly the engine for small consumers, and particularly so if required for intermittent use. Mr. Alf. Atkinson agreed with the lecturer that the engines should be sold by the brake horse power. He had noticed in gas engines a good many back explosions, which were dangerous and sometimes burst the cylinders. Mr. Blackburn spoke of the Atkinson gas engine and its method of cleaning out the products of combustion. Mr. Fowler said that in the four-cycle gas engines the working parts must be of sufficient strength to withstand the energy developed every other stroke, and he did not think the gas engine as at present made could ever be so efficient as the steam engine. The advantages of the Robey engine appeared to be smaller risks of back explosion and easier manipulation, which were of especial advantage where skilled attendants are not employed. He had no fear of the gas engine displacing the steam engine for large powers. At the Paris Exhibition he noticed that the larger gas engines required a smaller engine to start them. Mr. Scriven thought a metal capable of withstanding great heat was necessary for the construction of the cylinder and piston. Mr. B. Holgate asked what became of the coating of tar which must be deposited on the walls of the cylinder at each explosion; he thought perhaps the mineral oil used for lubrication might take it up, as Mr. Norris has said that mineral oil was the saving of the gas engine. Mr. R. H. Jackson, of Manchester, said the best indication was the quantity of gas consumed and the actual work done. He thought large gas engines might be started by storing up power for the purpose while the engine was running, instead of having a supplementary engine; he also said that the Atkinson engine showed the most economical results, but the wear and tear were enormous. Mr. Hesseldin thought the Robey method of adjusting the heat of the explosion far in advance of any other. Mr. Wood complained of gas engine makers rating the horse power far in excess of that actually given off. Mr. Norris, in his reply, said that many accidents from back explosions resulted from carelessness, owing to the instructions not being carried out. A most hearty vote of thanks was accorded to Mr. Norris, on the motion of the honorary secretary, Mr. J. A. Tempest, seconded by Mr. B. Holgate.

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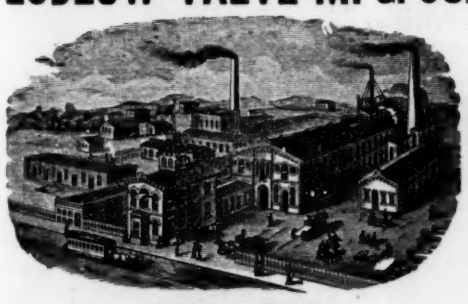

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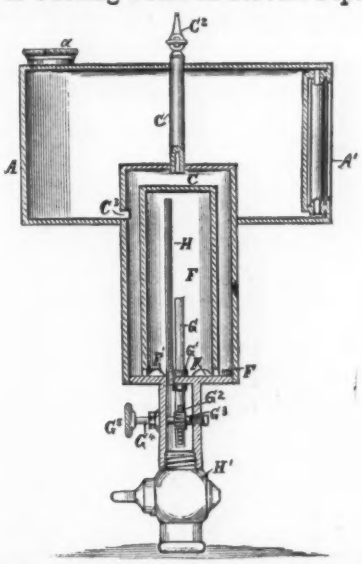

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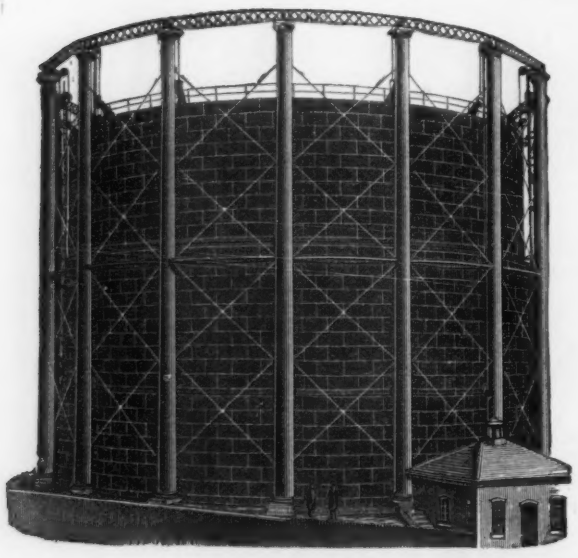

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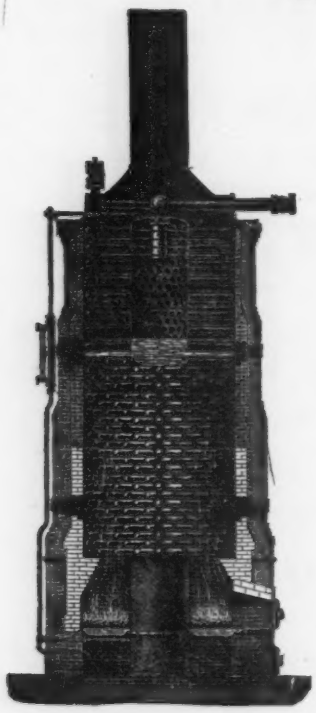

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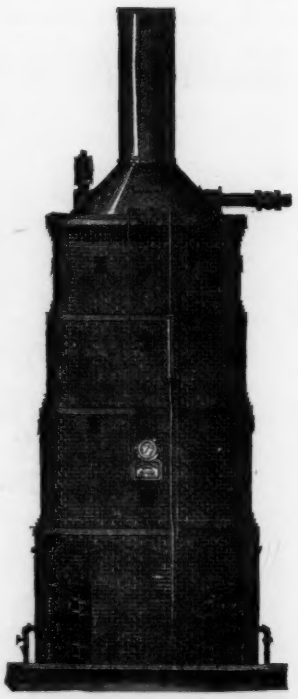

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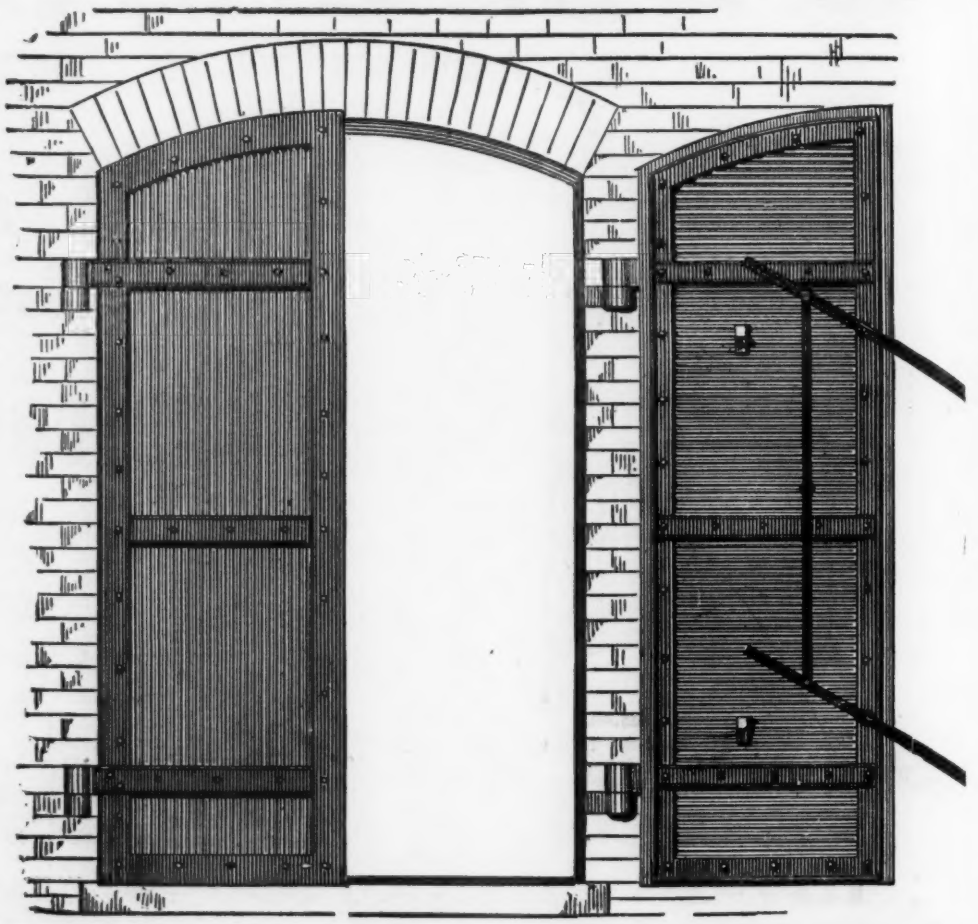

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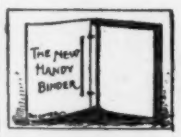

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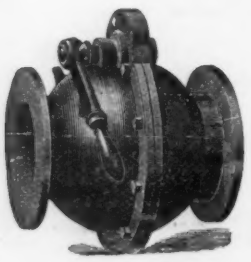

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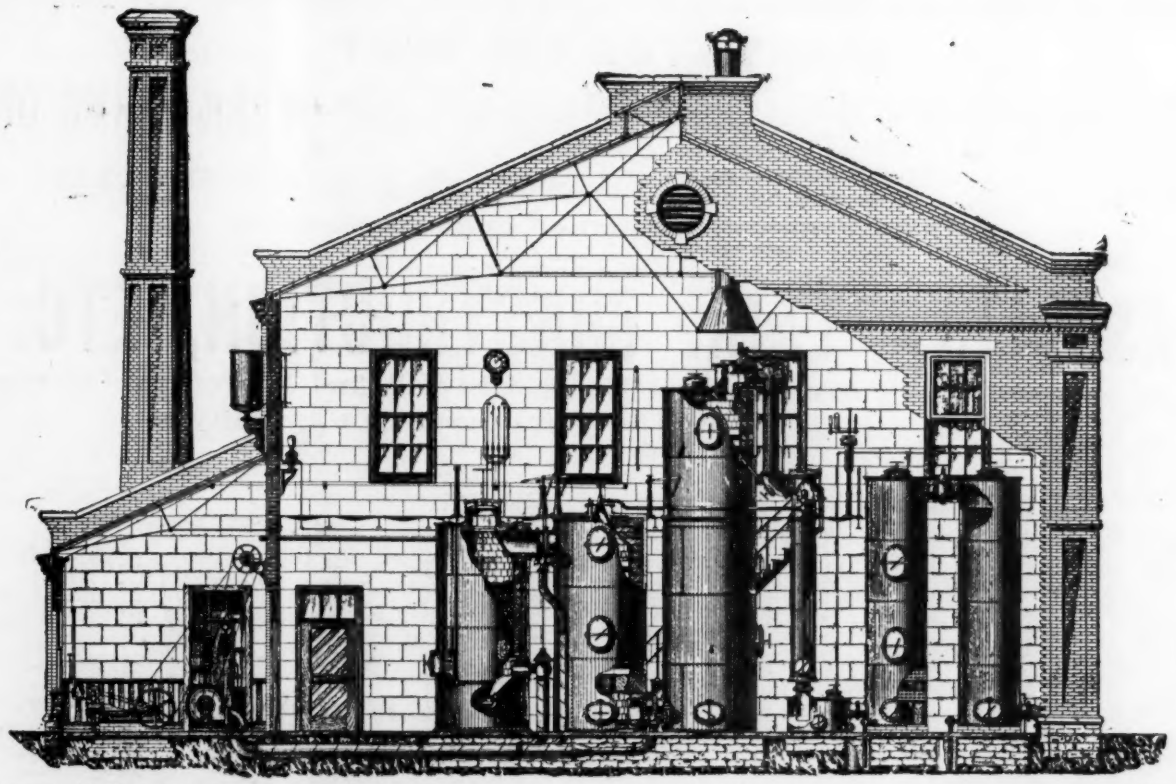

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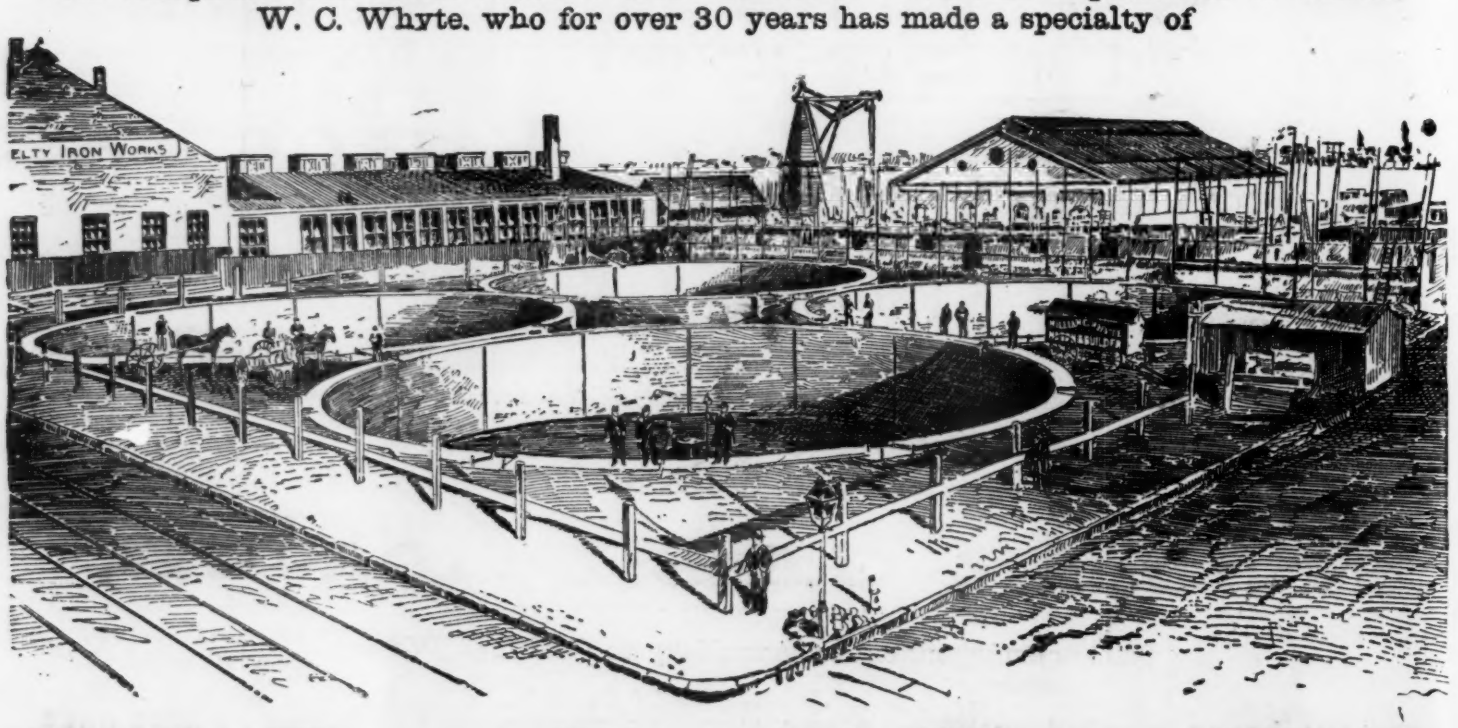

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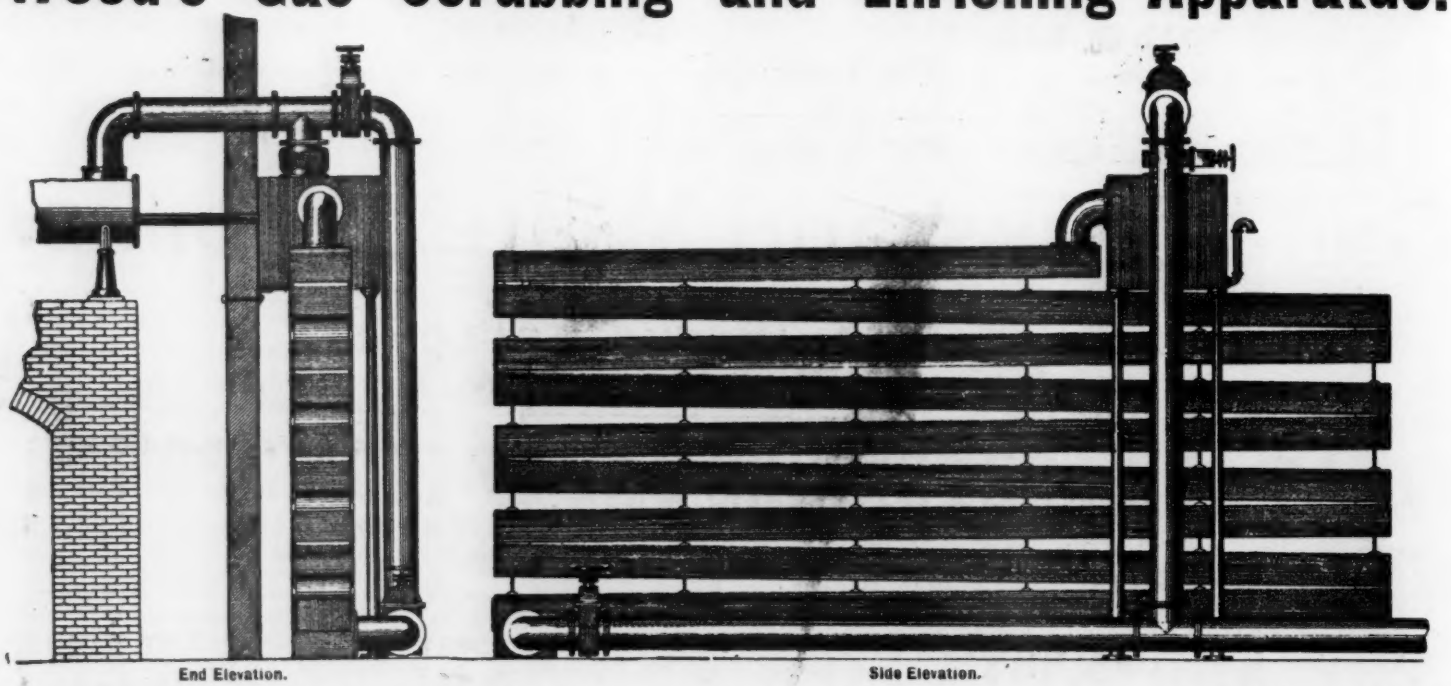

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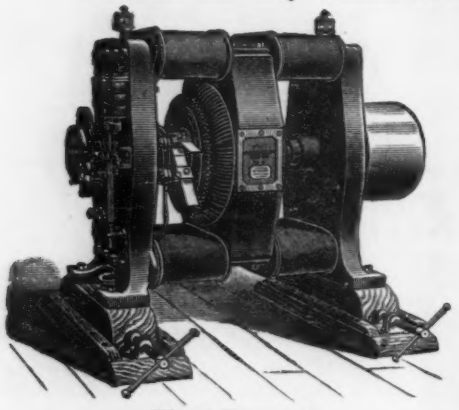

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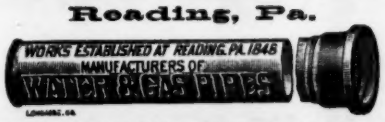

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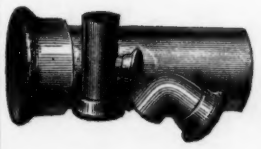

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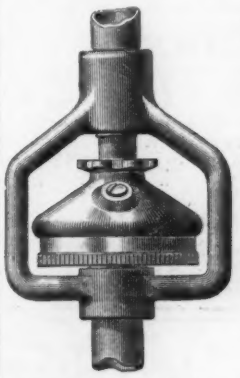

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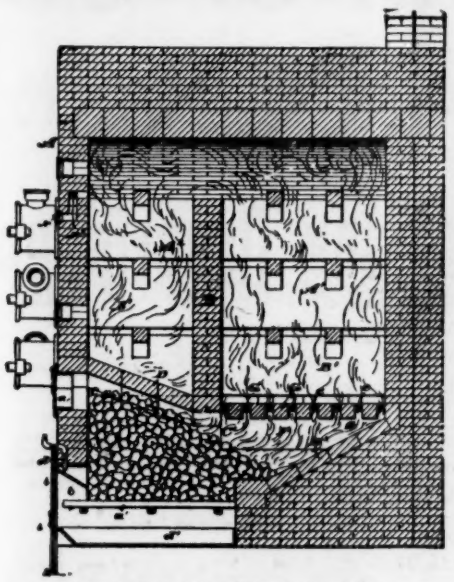

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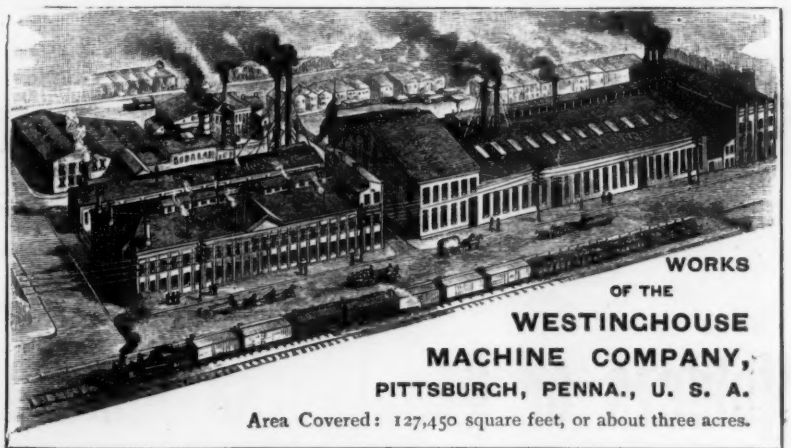

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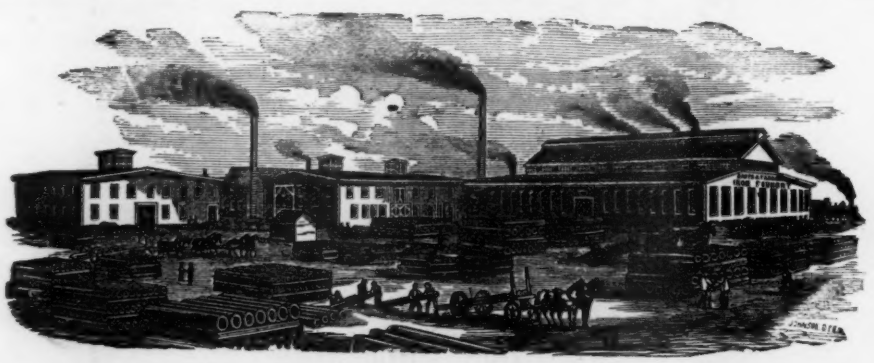

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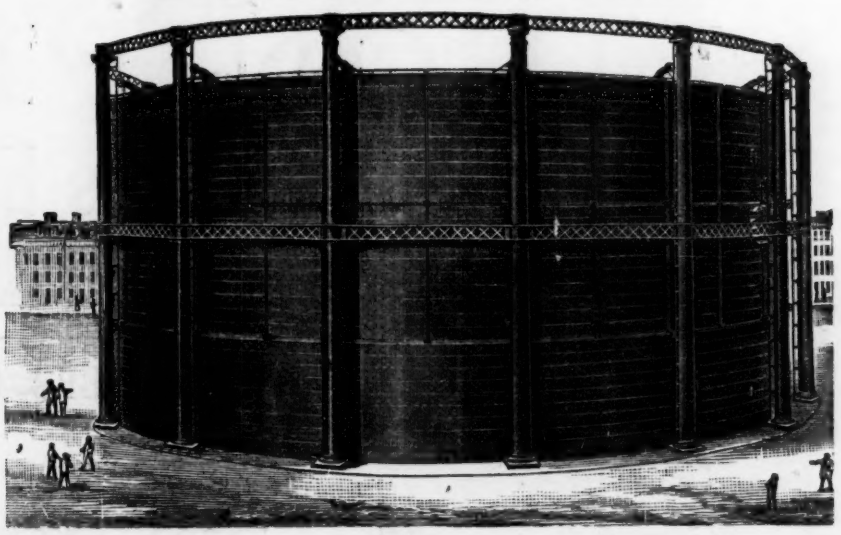

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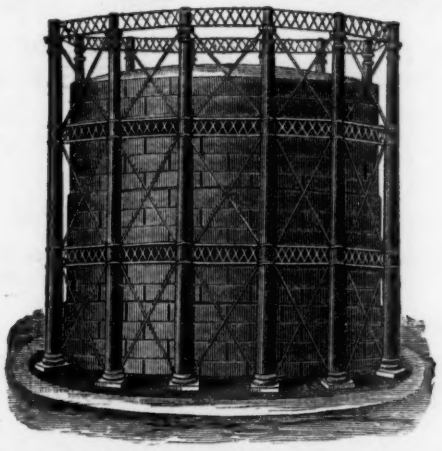

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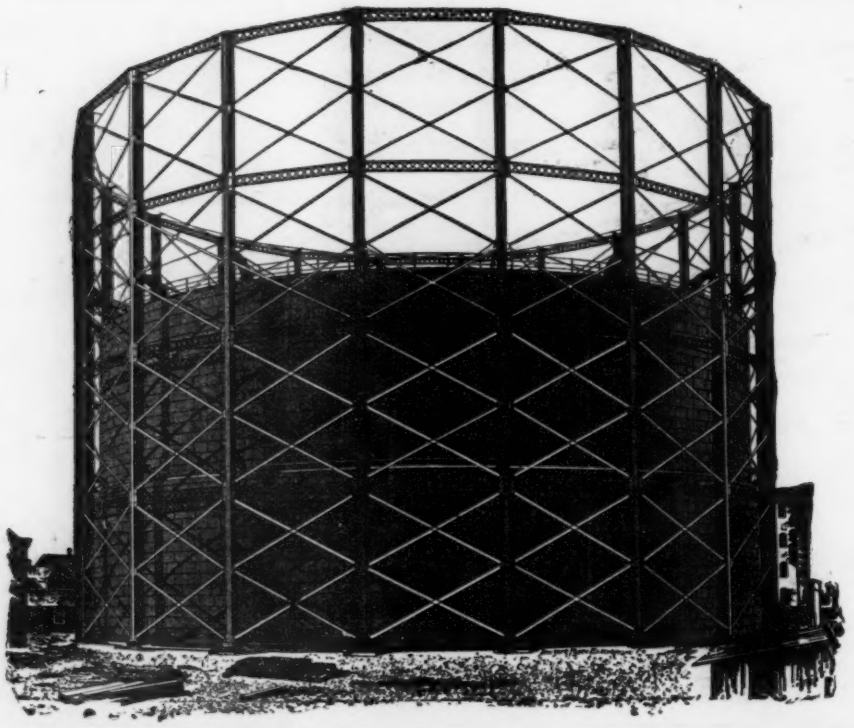

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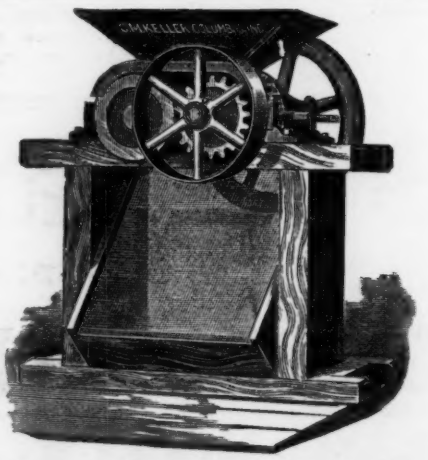

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